# A PROSPECTIVE STUDY ON THE DIAGNOSTIC YIELD OF LOWER GASTROINTESTINAL ENDOSCOPY FOR ALTERED BOWEL HABITS, LOWER ABDOMINAL PAIN AND RECTAL BLEEDING

A DISSERTATION SUBMITTED TO

**THE TAMILNADU DR.M.G.R MEDICAL UNIVERSITY**

*In partial fulfillment of the regulations for the award of the*

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**BRANCH – I**


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**STANLEY MEDICAL COLLEGE AND HOSPITAL**

**THE TAMILNADU DR.M.G.R MEDICAL UNIVERSITY**

**CHENNAI**

**APRIL 2014**

# CERTIFICATE

This is to certify that the dissertation entitled ***"A PROSPECTIVE STUDY ON THE DIAGNOSTIC YIELD OF LOWER GASTROINTESTINAL ENDOSCOPY FOR ALTERED BOWEL HABITS, LOWER ABDOMINAL PAIN AND RECTAL BLEEDING"*** is the bonafide work done by ***Dr. U.A. HEMNATH*,** Post Graduate student (2011 – 2014) in the Department of General Surgery, Government Stanley Medical College and Hospital, Chennai under my direct guidance and supervision, in partial fulfillment of the regulations of The Tamil Nadu Dr. M.G.R Medical University, Chennai for the award of M.S., Degree (General Surgery) Branch - I, Examination to be held in April 2014.

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# DECLARATION

I, **Dr. U.A. HEMNATH,** solemnly declare that this dissertation titled "***A PROSPECTIVE STUDY ON THE DIAGNOSTIC YIELD OF LOWER GASTROINTESTINAL ENDOSCOPY FOR ALTERED BOWEL HABITS, LOWER ABDOMINAL PAIN AND RECTAL BLEEDING"*** is a bonafide work done by me in the Department of General Surgery, Government Stanley Medical College and Hospital, Chennai under the guidance and supervision of my unit chief and Head of the Department **Prof. K. KAMARAJ M.S.**

This dissertation is submitted to The Tamilnadu Dr. M.G.R. Medical University, Chennai in partial fulfillment of the university regulations for the award of M.S., Degree (General Surgery) Branch - I, Examination to be held in April 2014.

**Place: Chennai.**

**Date: December 2013.** **DR. U.A. HEMNATH**

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# CONTENTS

# A PROSPECTIVE STUDY ON THE DIAGNOSTIC YIELD OF LOWER GASTROINTESTINAL ENDOSCOPY FOR ALTERED BOWEL HABITS, LOWER ABDOMINAL PAIN AND RECTAL BLEEDING

## ABSTRACT


### INTRODUCTION

Over the last two decades, there has been a remarkable advancement in gastrointestinal endoscopy, and lower gastrointestinal endoscopy (colonoscopy and sigmoidoscopy) has become the most commonly performed procedure for the diagnosis and treatment of diseases of the large intestine as well as screening for malignancy.The demand for lower GI endoscopy has been increasing over the years, given the relative safety and low complication rates.The diagnostic yield of an endoscopic procedure is defined as its capacity for identifying a lesion that is potentially important to patient care.

### AIM AND OBJECTIVES OF THE STUDY

1. To evaluate the spectrum of clinical findings in lower gastrointestinal endoscopy in patients presenting with altered bowel habits, bleeding per rectum and abdominal pain and to evaluate its diagnostic yield.

2. To analyze the symptomatology in colorectal carcinoma.

## MATERIALS AND METHODOLOGY

The 100 patients presenting with lower GI symptoms such as bleeding p/r, lower abdominal pain and altered bowel habits are subjected to lower GI endoscopy. The findings in the colonoscopy or sigmoidoscopy are recorded. The diagnostic yield of the procedure for the particular indication is calculated.

## RESULTS

The diagnostic yield of lower GI endoscopy in our study is as high as 44%, whereas the complication rate of diagnostic endoscopy is almost nil except minor abdominal discomfort. The diagnostic yield for colorectal cancer is highest for patients presenting with multiple lower GI symptoms. Rectal bleed is the most common presenting symptom in colorectal malignancy.

## CONCLUSION

From this study we conclude that lower GI endoscopy is mandatory in patients presenting with multiple lower GI symptoms and bleeding per rectum; and screening with sigmoidoscopy should preferably be considered in patients presenting with common diseases of the anorectum. In patients presenting with low yield symptoms, judicious decision making is required to either subject the patient to endoscopy or other less invasive investigations.

**KEYWORDS:** Colonoscopy, sigmoidoscopy, diagnostic yield

# INTRODUCTION

Colorectal cancer ranks third as the most common malignancy in the United States and represents the second leading cause of cancer-related mortality; approximately 147,000 patients are diagnosed with colorectal cancer each year and 57,000 deaths are attributed to this disease.[1, 2] The incidence rates of rectal cancer are disproportionately higher in rural India.[3] The variation of the incidence rates of colorectal cancer across India is limited unlike the striking north south differences in the incidence rates of stomach cancer and gall bladder cancer. The population based time trend studies show a rising trend in the incidence of colorectal cancer in India; worrisome is the finding that the incidence rates of colorectal cancer in Indian immigrants to the United Kingdom and USA are much higher, suggesting that life styles and dietary habits are important in the causation of the colorectal cancer; means that with economic transition from a low income to middle income economy there will be a big increase in the burden of CRC in India.[3]

It is imperative to screen for and detect colorectal cancer early to prevent morbidity and mortality. In the last two decades there has been an overwhelming improvement in gastrointestinal endoscopy. Lower gastrointestinal endoscopy has become the commonest procedure for the

diagnosis of diseases of the large intestine. It has become the most accurate investigating tool in the workup and screening of patients with lower gastrointestinal symptoms. Given the relative safety and the easy availability of colonoscopy, has also led to an inappropriate referral and overuse of this procedure. The reported range for inappropriate referral and use of lower gastrointestinal endoscopies is found to be between 15% and 35% in different studies. Several consensus based reports and other studies by expert panels have come up with guidelines for appropriate use of both upper and lower gastrointestinal endoscopies. The American Society for Gastrointestinal Endoscopy (ASGE) has developed guidelines for appropriate use of lower gastrointestinal endoscopies and periodically reviews the guidelines on the appropriate use of these procedures with frequent updates.[6]

The diagnostic yield of an endoscopic procedure for a specified indication is defined as its ability for identifying a pathological lesion that is potentially important for the diagnosis and treatment.[17] It has been reported for both upper and lower gastrointestinal endoscopy in relation to the appropriateness of the indication. For lower gastrointestinal endoscopy (sigmoidoscopy and colonoscopy) it has been reported to be ranging between 40-45% for procedures that are

referred for appropriate indications and 15-20% for those with inappropriate indications as per the ASGE guidelines.[6]

Though the lower gastrointestinal endoscopic procedures are relatively safe, it is not without complications.[20] It also requires specialised skills to perform the procedure. Therefore it should be done in patients in whom it gives necessary information and aids in further treatment and there should be a selection criteria to validate the use of lower gastrointestinal endoscopy to maximize its benefits and minimize its inappropriate use. The aim of this study is to evaluate the diagnostic yield of common lower gastrointestinal symptoms for appropriate use of endoscopic services and to screen and detect colorectal malignancies at the earliest.

# REVIEW OF LITERATURE

## HISTORY OF COLONOSCOPY

*"Over the course of decades in clinical practice, examining literally hundreds of thousands of people as a gastrointestinal endoscopist, I have learned that when a person's gastrointestinal system is clean, that person's body is easily able to fight off diseases of whatever type."*

-Dr. Hiromi Shinya

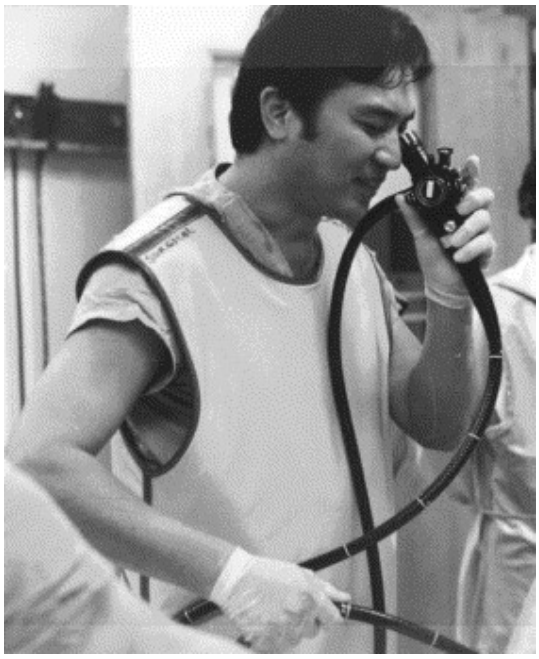

**Figure 1 Dr. Hiromi Shinya with his fibro-optic colonoscopy**

In 1969, a young Japanese gastroenterologist at Beth Israel Hospital in New York City Dr. Hiromi Shinya developed the equipment & technique to endoscopically remove polyps; avoiding what before then meant major abdominal surgery. It was an historic breakthrough in the prevention of colon cancer.[4, 5]

Dr. William Wolff and Dr. Hiromi Shinya pioneered the development of complete lower gastrointestinal endoscope called the colonoscope. Their invention in 1969 was an advancement over the barium enema and the flexible sigmoidoscope as it allowed for the visual examination from the entire large intestine. Wolff and Shinya published their early evidences to overcome the skepticism about the device's safety and efficacy.[4, 5] Once the basic technology of the colonoscope had been accepted, the device lent itself to adaptations that have bettered its performance, and broadened its applications; the use of colonoscopy to screen and diagnose colorectal cancer continued to rise. Importantly the significance of the test has been to permit an understanding of colorectal cancer through the collection of biopsies and to lower mortality of colorectal malignancy through screening and early diagnosis.

## ANATOMY

The colon is described as the gastrointestinal segment that extends from the ileocecal valve to the rectum. The location of the colon in the peritoneal cavity greatly varies based on individual shape and extent of mesenteric attachment. The hepatic flexure lies lower than the splenic flexure, as can be seen on barium enema. The ascending and descending colons are retroperitoneally located, whereas the transverse and sigmoid colons have mesenteries. The length of the colon ranges between 120 and 200 cm and it varies with individuals. Women had a longer colon than men, with a median of 155 versus 145 cm and also women have a longer transverse colon, which also carries an increased likelihood of location within the pelvis. These anatomic variations explain why colonoscopies are generally more difficult to perform in women than in men.

Three distinctive basic macroscopic features in the colon help differentiate it from the small bowel:

- Presence of taeniae coli
- Presence of haustra coli
- Appendices epiploicae, or fatty appendices

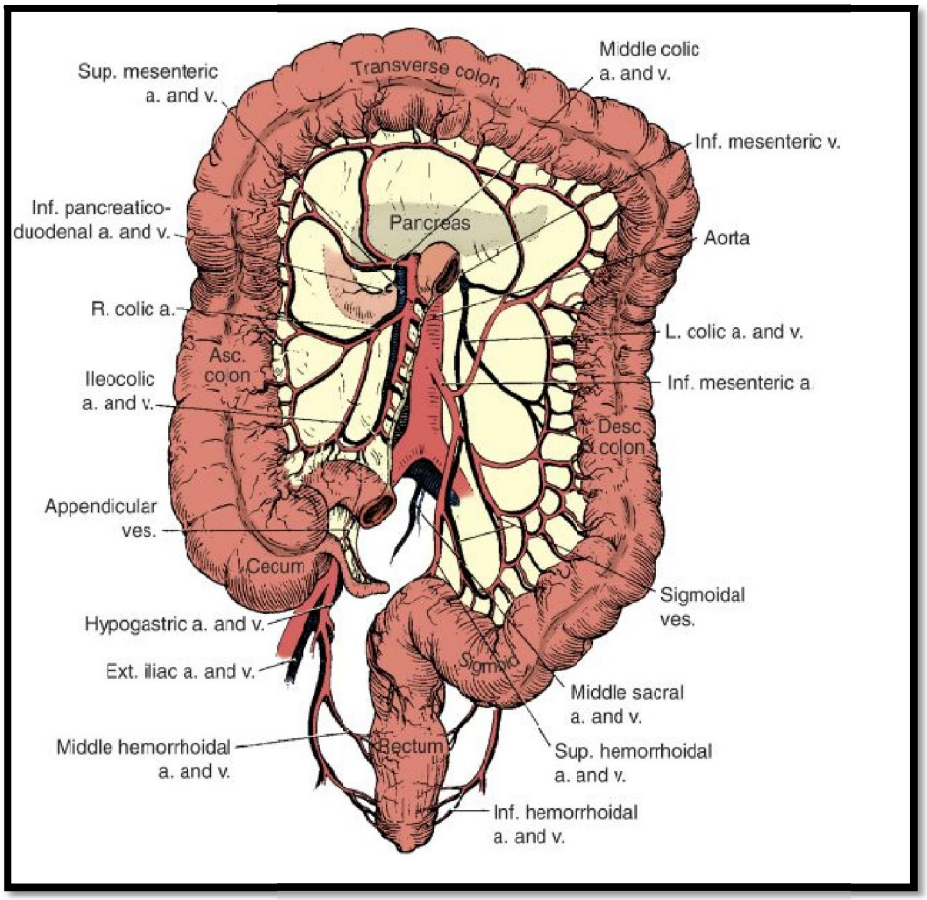


**Figure 2 GROSS ANATOMY AND VASCULATURE OF THE COLON**

The taeniae coli are condensations into three bundles of the longitudinal muscular layer of the large bowel, that are macroscopically visible, although a thinner longitudinal layer remains to completely encircle the lumen. Taeniae extend from the cecum to the end of the sigmoid. The taeniae contribute to the configuration of the haustra as convex folds of colonic wall which renders colon its saccular appearance. The appendices epiploicae are like droplets of yellow

adipose tissue surrounding the colonic wall. They are prominent in the sigmoid, and they become absent in the rectum.

**Caecum**

The caecum is the proximal portion of the colon after the ileocecal valve and it continues into the ascending colon. It measures approximately 6 cm in length and 7.5 to 8 cm in width. The cecum is generally covered by peritoneum, although in most cases, there is no distinct mesentery and the mobility is limited. The lowest haustrum corresponds to caecal fundus which can be endoscopically viewed, where the appendiceal orifice is usually visible and is a useful indicator of a complete colonoscopic exploration. A mucosal fold known as *Gerlach's valve* rarely covers the appendiceal orifice. A landmark visible endoscopically is the ileocecal valve, with the ileal orifice delimited by two distinct lips such as the ileocolic and the ileocecal lip.

**Appendix**

The vermiform appendix is in continuation with the cecum through the appendiceal orifice which is surrounded by a continuous longitudinal muscular layer; which results from the union of the three taeniae. It is 8 to 9 cm long and it can range from 5 to 35 cm. In

approximately 65% of patients, the appendix courses vertically in the retrocecal recess and in 31%, it descends into the iliac fossa or it can be encountered in a paracecal, preileal, or postileal location. The appendix is accompanied by its corresponding mesoappendix, which contains the appendicular artery, a terminal artery without any arterial arcades. The venous drainage is to the ileocolic and the right colic veins and the lymphatics drain into the ileocecal nodes and then along the SMA nodes into the celiac nodes.

**Ascending Colon**

The ascending colon lies on the right side of the abdomen in front of the quadratus lumborum and transversus abdominis muscle. It extends from the cecum to the hepatic flexure. On an average it measures 12 to 20 in length. Mostly, the ascending colon is covered by peritoneum on its anterior and lateral aspects and is fixed posteriorly. Uncommonly, a tenuous adhesion from the right abdominal wall to the anterior taeniae of the ascending colon has been observed, which is referred to as *Jackson's membrane.* In the lower margin of the liver and lateral to the gallbladder, the ascending colon turns to the left and this point is known as *hepatic flexure.* The hepatic flexure lies above the

second portion of the duodenum and it is sometimes attached by a peritoneal fold referred to as *duodenocolic ligament.*

**Transverse Colon**

The transverse colon connects the ascending and descending colon. It courses horizontally across the abdominal cavity and it is attached to the posterior abdominal wall by a long mesentery, which renders it extremely flexible. The transverse colon is quite long, 40 or 50 cm and sometimes it can reach the iliac crests or even lie deep into the pelvis. The duodenojejunal junction, known as the *ligament of Treitz,* lies just inferior to the root of the transverse mesocolon. The greater omentum covers the transverse colon almost it's entire length and is connected to it by the gastrocolic ligament. The splenic flexure lies higher than the contralateral hepatic flexure and is connected by flimsy adhesions to the lower pole of the spleen, which contributes to render it a fixed bowel segment. This anatomic location is often difficult to access and makes the spleen at increased risk of inadvertent tears during surgical dissection of the splenic flexure.

**Descending Colon**

The descending colon extends from the left upper quadrant to the pelvic brim. It connects the splenic flexure to the sigmoid colon and It

measures approximately 30 cm and descends vertically and slightly toward the midline in the groove between the psoas and the quadratus lumborum. It is surrounded by the peritoneum anteriorly and bilaterally, whereas in most cases and it is fixed on the posterior peritoneum through the Toldt fascia and this is an important surgical plane to allow for a bloodless dissection.

**Sigmoid Colon**

The sigmoid colon starts at the pelvic brim at the point where the descending colon turns medially. It terminates at the level of the sacral promontory where the three taeniae commonly coalesce into a diffuse longitudinal muscular layer devoid of any epiploicae. The presence of a distinct sigmoido-rectal sphincter is generally not recognized, even though Shafik and colleagues have identified distinct, thickened smooth muscle bundles at the junction of sigmoid and rectum. The diameter of the sigmoid colon decreases along its course. Its long mesocolon with a short base predisposes to the onset of sigmoid volvulus. A long convoluted sigmoid has been implicated in the origin of constipation. The mesosigmoid contains a recess known as the *intersigmoid fossa,* which can be used as a landmark for identification of the ureter.

**Arterial Blood Supply**

The vascular supply of the colon is variable. It receives its blood supply from both the SMA and the inferior mesenteric artery (IMA) systems; the branches of each system and the connections between the two systems are variable.

The SMA system supplies the right and the proximal transverse colon; the IMA system sends tributaries to the distal transverse, descending, and sigmoid colon.

The marginal artery of Drummond goes in close proximity and parallel to the bowel wall. It is variably anastomosed to the terminal portions of the named colic trunks as well as peripheral branches and gives origin to the terminal vasa recta that directly supply the bowel wall. The marginal artery is less consistently encountered at the level of the splenic flexure, where the vascular arcades connecting the MCA and LCA are often absent, in a critical colonic segment that has been described as the *Griffith's point.* It has been suggested that an inconsistent marginal artery might also enhance a more tenuous vascular supply at the junction of the lowest sigmoid branch and the superior hemorrhoidal artery, referred to as *Sudek's point.*

The meandering artery or Arc of Riolan is an additional collateral branch that can seen occasionally;  it connects the proximal MCA to the LCA and runs in the transverse mesocolon parallel to the left branch of the MCA.

**Venous Return**

The venous return generally corresponds to the arterial supply. The right side of the colon drains into the SMV and from there into the portal vein; the left colon drains into the IMV and from there drains into the splenic vein and only then into the portal system. The cecum and the appendix drain into the ileocolic vein, which is a tributary of the SMV.

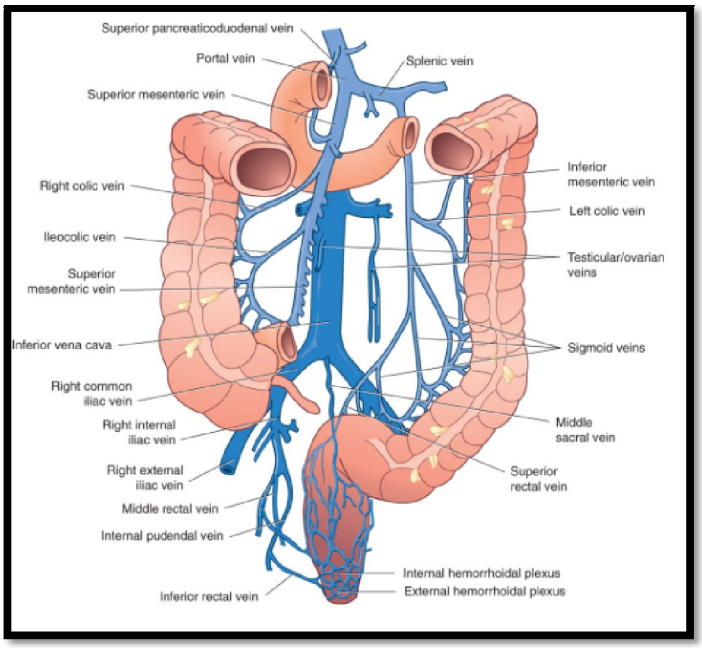


**Figure 3 VENOUS DRAINAGE OF THE COLON**

## Lymphatic Drainage

Colonic lymphatics are divided into four drainage levels. The lymphatic plexuses located on the bowel wall drain first into the epicolic nodes which are located in the epiploic appendages and subserosally. The lymphatics from the epiploic nodes then drain into the paracolic nodes which are located behind the peritoneum on the upper border of the transverse and on the mesenteric side of the remaining colon. The intermediate nodes which are the third lymphatic station are encountered along the course of the main colonic vessels, the ICA, RCA, MCA, LCA, and sigmoid branches. The intermediate nodes ultimately drain into the lymph nodes along the two main colonic tributaries, the SMA and IMA; from these two main trunks the lymphatic drainage continues into the iliolumbar chain and terminates into the thoracic duct.

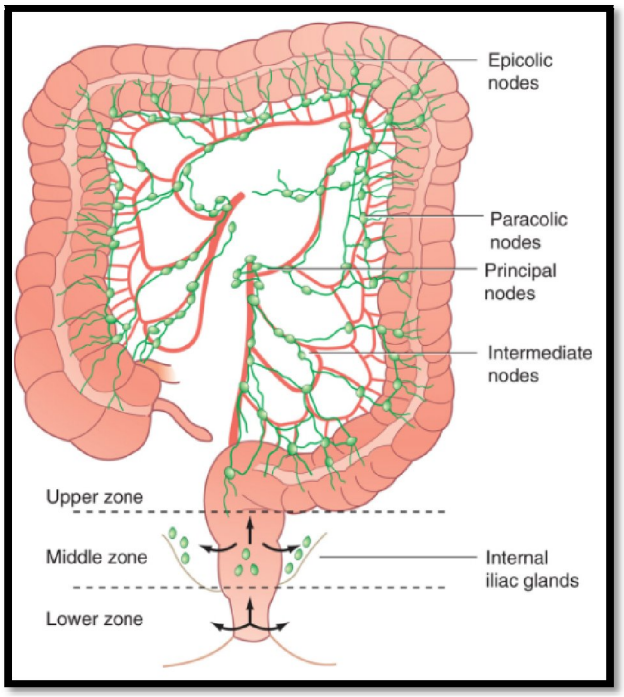


**Figure 4 LYMPHATIC DRAINAGE**

## INVESTIGATIONS AND EVALUATION OF DISEASES OF THE ANAL CANAL, RECTUM AND COLON

The appropriate treatment of diseases of the colon, rectum, and anus relies on a correct diagnosis which is built on three pillars such as history, examination, and investigation. To take a good accurate and targeted history; and to perform a careful and revealing physical examination; and to choose the right investigations requires great skill and acumen. This wisdom comes with experience and it is of great value in perfecting these diagnostic techniques. Clinical diagnostic skills have been less valued as part of a diagnostic work-up since the early 1980s;

as easy access to a world of imaging techniques has tended to encourage taking "the easy way out." As clinicians, we are asked to account for the costs of every investigation; so we are reminded to begin with as thorough a clinical assessment as possible to save expensive investigative tests for well-defined indications. We need to ask the right questions of our patients; and know what to look for on examination; and how to look for it; and choose only tests that will make a difference.

## HISTORY

### General Principles of history taking

The history of a patient can be the key to the diagnosis of any disease, particularly of the colon, rectum and anal canal. When the patient describes symptoms we should assess the likely site and nature of the problem; and direct the remainder of the history. To keep one's mind open is important though, as a patient may use his own diagnostic terminology in a lay application and misguide the clinicians in diagnosing his condition. For example, when a patient says he has "hemorrhoids" could mean any ano-rectal diseases such as rectal prolapsed perianal abscess or fissure in ano. Basic history-taking skills are important; and are refined by a mental differential diagnosis that impels specific questions. An astute clinician should take detailed

history about the patient's bowel habits, dietary habits, and use of any medications. Apart from the history should also include details about the presenting complaint; the comorbid diseases; the medications that are used over-the-counter, drug allergies and intolerances, previous operations; and history of related diseases or colorectal cancer in the family members. History must also include inquiry about the sexual habits as it is related to many anal and rectal diseeases. After a thorough history the probable differential diagnosis should be fairly well established which should then guide further clinical examination and necessary relevant investigations to confirm or exclude some of the possible diagnoses and to exclude other common complicating conditions.

**Symptoms**

- Bleeding
- Anorectal Pain, Itching, and/or Swelling
- Abdominal Pain and/or Distention
- Constipation
- Diarrhea
- Urgency and Incontinence

## EXAMINATION

### General Principles

Patients with a disease of the lower gastrointestinal tract bear the burden of embarrassment in addition to concerns about their symptoms, diagnosis, and prognosis. They expect a professional attitude; consideration to covering sensitive areas where possible; and a minimal number of observers in the room. A same gender nurse should be present during the examination. Gentle examination is paramount to minimizing discomfort, especially when performing anal examinations. Maximum information can be obtained only if the patient is able to tolerate the examination and relax. Anoscopy and proctosigmoidoscopy allows visual evaluation.

### Position

Most patients undergo anorectal examination in the prone jackknife or left lateral decubitus position. The patient is covered with a sheet; lying in the left lateral decubitus (Sims') position; the hips and knees are flexed; and the patient's hips are positioned on the edge of the table. The head, knees, and feet are situated opposite the examiner,

angling the patient's body across the table. The perineum is then undraped to allow isolated exposure of the examination area.

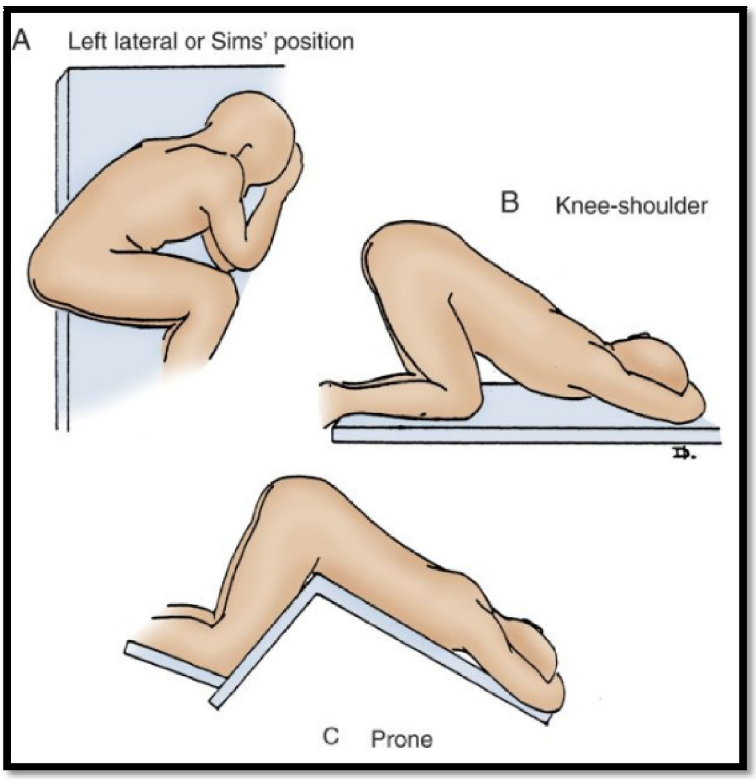


**Figure 5 PATIENTS' POSITION FOR CLINICAL EXAMINATION OF RECTUM AND ANAL CANAL**

## Inspection and Palpation

Examination of the perineum and anus must be systematic. The examiner should position himself on opposite side of the patient and then gently separate the buttocks; with the examiner leaving his or her dominant hand free. The sacrococcygeal region is inspected to exclude pilonidal disease. The skin changes are then inspected, for abnormalities

that include excoriation, maceration, ulceration, drainage sites, lesions, and masses. The perianal region is observed for external hemorrhoids, skin tags, scarring, and deformity. Retraction allows inspection of the anal verge and distal canal for a fissure, ulcer, and prolapsing anal papillae or internal hemorrhoids. If rectal prolapse is suspected, the patient is asked to perform the Valsalva maneuver to look for prolapsing mucosa or rectal wall.

Palpation of the perineum is performed. Presence of tenderness, fluctuation or induration suggets abscess. Fistula tracts can be felt as they course from an external opening towards the anal canal. A well-lubricated finger is then gently and slowly inserted into the anal canal to assess sphincter tone. As the finger passes along the anoderm above the intersphincteric groove, the canal should feel smooth and nonulcerated. The dentate line can be felt, as the mucosa changes into more irregular tissue. Hypertrophied anal papillae and masses can be best appreciated by rotating the digit. Internal hemorrhoids are rarely palpable. The patient is asked to squeeze around the examining finger to assess external sphincter and puborectalis function. The distal rectum is examined last, beginning with palpation of the prostate or cervix through the anterior rectal wall. The rectum is circumferentially palpated to exclude tenderness, induration, polyps, and masses.

## INVESTIGATION

### Blood and Stool Testing

Blood and stool tests are helpful in the evaluation of some disorders of the large bowel and anus. Serum electrolyte abnormalities can affect bowel frequency with few other systemic manifestations; altered thyroid-stimulating hormone levels may identify the cause of intestinal symptoms related to thyroid dysfunction; a bleeding colorectal neoplasm may be the cause of a microcytic, hypochromic anemia.

Stool tests for ova, parasites, and other pathogens can diagnose infectious colitides. Serum and stool tests are used in the evaluation of colorectal carcinoma. Serum carcinoembryonic antigen (CEA), a glycoprotein found in the cell membrane of cancer cells is the tumor marker most often used clinically. Unfortunately, CEA is not specific for the gut epithelium or malignant neoplasms; and is not useful as a screening tool. Preoperative CEA levels herald postoperative disease recrudescence and recurrence; an elevated preoperative level does not return to normal, undetected disease is suspected; if the level normalizes but begins to return to abnormal range, recurrence will likely be discovered with further investigation.

A common screening test for colorectal malignancy is guaiac-based fecal occult blood testing, (FOBT). FOBT has been used widely for more than 30 years. FOBT is the only noninvasive screening test shown to decrease mortality from colorectal malignacy.

Blood testing for gene abnormalities are used for persons with particular forms of inherited colorectal malignancies, such as familial adenomatous polyposis (FAP) and hereditary nonpolyposis colorectal cancer (HNPCC).

**Endoscopy**

**Anoscopy**

Examination of the anal canal is best performed with an anoscope. Digital rectal examination should always precede insertion of the anoscope. The patient is informed of the procedure. A well-lubricated anoscope is gently applied against the anus; and gradual pressure is applied to pass the scope into the canal. Difficulties are suggestive of sphincter spasm or anal stenosis, mandating the use of a smaller-caliber anoscope; or of anal pathology that necessitates examination under anesthesia. Once inserted, it is used to circumferentially inspect the anal canal and, occasionally, the lower

rectum. The scope is withdrawn in each quadrant to allow visualization of all mucosa.

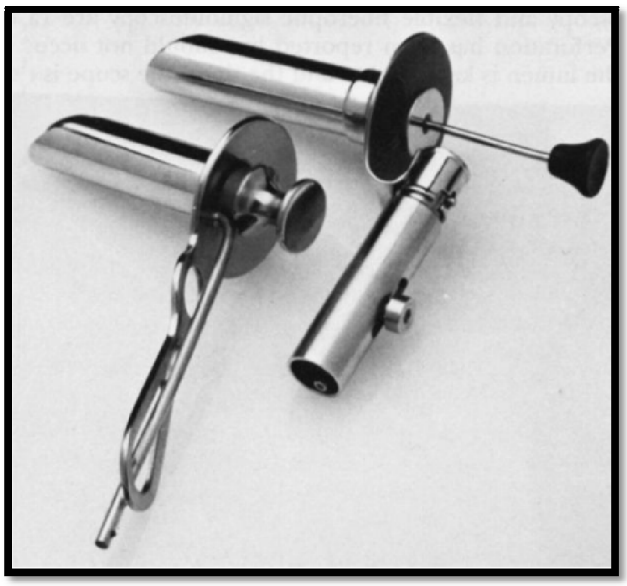

**Figure 6 ANOSCOPE**

## Rigid Proctosigmoidoscopy

Rigid endoscopy is the procedure of choice for evaluation and treatment of distal rectal lesions. A rigid scope more accurately measures the location of a tumor relative to the anal verge than a flexible endoscope. The rigid instruments are 25 cm long and have a diameter of 11, 15, or 19 mm. The scope is inserted after anoscopy has been completed; after the rigid proctosigmoidoscope has passed through the sphincters while typically directed toward the umbilicus, the

obturator is removed, and the scope is advanced under direct visualization.

The direction of the scope is posteriorly along the sacral hollow, around the inferior (left posterior), middle (right anterior), and upper (left posterior) valves of Houston. The rectosigmoid junction will come into view after 17 to 19 cm; further insertion will cause many patients to experience crampy visceral pain that resolves with instrument withdrawal. The angulated rectosigmoid may appear as a blinded end to the rectum with no visible rectum, with gentle manipulation to the left and then to the right will often open the sigmoid lumen to inspection. Air insufflation facilitates the procedure, but excessive use is painful and interferes with the examination. Careful examination is performed during withdrawal while sweeping the scope around to inspect all mucosal surfaces; flattening the rectal valves to survey their cephalad components.

Biopsy can be done posteriorly along the folds of the valves, to minimize the risk of perforation. Small lesions can be fulgurated. Larger polyps can be excised with a Frankfeldt snare. Anterior biopsies above the middle rectal valve are especially prone to intraperitoneal perforation because this area is situated above the peritoneal reflection.

Perforation occurs in about 0.005% to 0.01% of rigid procedures. Perforation by the scope occurs at areas of angulation, bowel wall weakness, and intestinal fixation. Bleeding after biopsy usually ceases spontaneously. Explosion can occur during electrocoagulation in the presence of methane and hydrogen gases.

**Figure 7 RIGID SIMOIDOSCOPE**

## Flexible Proctosigmoidoscopy

Flexible proctosigmoidoscopy better tolerated and more sensitive in detecting distal large bowel lesions while allowing greater length of intestine to be inspected. The scope is advanced to the rectosigmoid,

where passage requires a combination of torque and in-out motion to avoid loop formation that causes discomfort, precluding further examination. The flexible instrument is advanced with care taken to avoid intubation of wide-mouthed diverticula. The descending colon can be negotiated with ease but occasionally requires the assistant to splint the abdominal wall to avoid looping. The flexible proctosigmoidoscope can be inserted to at least 50 cm.

Biopsy samples are obtained from haustral folds. Electrocoagulation should be avoided because of the risk of explosion. Perforation occurs in 0.01% of patients.

**Figure 8 FLEXIBLE SIGMOIDOSCOPE**

## Colonoscopy

Colonoscopy is the most essential tool in the diagnosis of several benign and any malignant diseases of the colon and rectum. It can be used in the asymptomatic patient as screening for early neoplasm; is an important diagnostic tool in adenomatous, bleeding, and inflammatory conditions.

In the acutely bleeding patient emergency colonoscopy can identify the bleeding source in 70% to 92% of patients with moderate or severe lower gastrointestinal hemorrhage (LGIH); endoscopic management of LGIH can be achieved in many cases with coagulation, injection, and occlusion devices.

**Figure 9 COLONOSCOPE**

**Radiologic Tests**

- Plain Films
- Colonic Transit Study
- Single-Contrast Barium Enema
- Double-Contrast Barium Enema
- Water-Soluble Contrast Enema
- Contrast Fistulography
- Defecography
- Endoluminal Ultrasound
- CT Scanning
- CT Enterography (Virtual colonoscopy)
- MR Imaging
- Positron Emission Tomography

## IMPORTANT DISEASES OF COLON, RECTUM AND ANAL CANAL

### DIVERTICULAR DISEASE

A colonic diverticulum is an abnormal sac or pouch protruding from the colon. A *true diverticulum* has all layers of the intestinal wall; a *false diverticulum*, or *pseudodiverticulum*, lacks a portion of the

normal bowel wall. The diverticula that occurs in colon are are devoid of the normal muscular layers, they are pseudodiverticula.

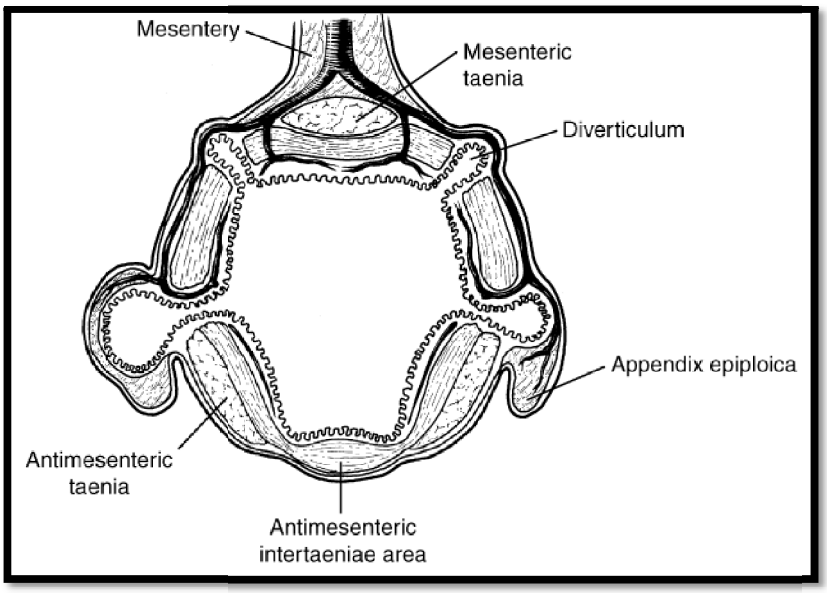


**Figure 10 PATHOGENESIS OF DIVERTICULUM**

## Diverticulitis

Diverticulitis is the result of a perforation of a colonic diverticulum; it is an extra-luminal pericolic infection caused by the extravasation of feces through the perforated diverticulum. The highest incidence of diverticula is in the sigmoid colon. It is by far the most frequent site for involvement with diverticulitis. Patients usually complain of left lower quadrant abdominal pain radiating to the suprapubic area, left groin, or back; alteration in bowel habit; fever, chills, and urinary urgency are common; rectal bleeding is not usually associated with an attack of diverticulitis.

A limited sigmoidoscopic examination may be helpful, however air should not be insufflated through the endoscope because of distention of the colon and the possibility that increased colonic pressure could force more bacteria through the perforation into the peritoneal cavity. The sigmoidoscope can usually only useful to exclude a cancer of the rectum as a cause of the symptoms.

If the diagnosis is in doubt, four diagnostic tests can be considered: computed tomography (CT) of the abdomen, magnetic resonance imaging (MRI), abdominal ultrasound, and water-soluble contrast enema. Ultrasound of the abdomen has many of the advantages of CT, including the possibility of percutaneous drainage of an abscess with ultrasound guidance.

Hinchey and Co described a practical classification system that provides some organization of the broad clinical spectrum of the disease:

Stage I: pericolic or mesenteric abscess

Stage II: walled-off pelvic abscess

Stage III: generalized purulent peritonitis

Stage IV: generalized fecal peritonitis

Uncomplicated diverticulitis can often be treated with antibiotics on an outpatient basis. A first attack of uncomplicated diverticulitis is usually treated with antibiotic therapy, with the introduction of a high-fiber diet. If a patient suffers recurrent attacks of diverticulitis, surgery is the treatment of choice.

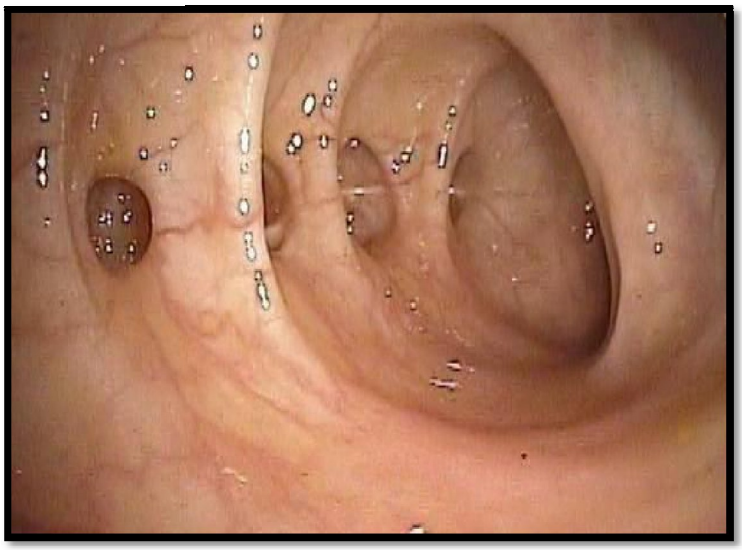

**Figure 11 DIVERTICULAR DISEASE**

## Complicated Diverticulitis

### Abscess

An abscess complicating diverticulitis is usually confined to the pelvis and patients presents with significant pain, fever, and leukocytosis. Examination may detect a tender, fluctuant mass. CT scan, MRI, or ultrasound will confirm the diagnosis and location of the

abscess. Abscess >2 cm in diameter, should be drained. The preferred method of drainage is a percutaneous route guided by CT or ultrasound. A pelvic abscess can be drained into the rectum through a transanal approach. Transabdominal approach by laparotomy has the risk of spreading the contents of the abscess throughout the peritoneal cavity and hence not preferred.

Drainage of the abscess and intravenous antibiotics usually results in a rapid clinical improvement. A fistula may result from the sigmoid colon to the insertion site of the percutaneous catheter; this can be easily handled at the time of elective surgery when the intense intra-abdominal infection has subsided.

Elective surgery should be offered after the patient has completely recovered from the infection, usually about 6 weeks after drainage of the abscess; at that time, it is usually feasible to excise the diseased sigmoid colon and fashion an anastomosis between the descending colon and rectum, thus avoiding a colostomy.

**Fistula**

A fistulous communication between the sigmoid colon and the skin (which may result from percutaneous drainage of an abscess),

bladder, vagina, or small bowel is a relatively frequent complication of diverticulitis. Symptoms of a sigmoid-vesical fistula are pneumaturia (passage of air from the urethra classically noted at the end of micturition), fecaluria, and recurring urinary tract infections. The investigation of choice is a CT scan, which may demonstrate air in the bladder. Initial treatment includes control of infection and thereby to reduce the associated inflammation.

Fistulas caused by diverticulitis can usually be treated by a one-stage operation; taking down the fistula and excising the sigmoid colon; and then fashioning an anastomosis between the descending colon and the rectum.

**Generalized Peritonitis**

Generalized peritonitis resulting from diverticulitis can be due to

(1) a diverticulum perforates into the peritoneal cavity, and the perforation is not sealed

(2) an abscess that is initially localized expands and suddenly bursts into the unprotected peritoneal cavity.

Patients present with generalized peritonitis caused by a perforated diverticulum; exhibit diffuse abdominal tenderness, with voluntary and involuntary guarding over the entire abdomen. Imaging may reveal intraperitoneal free air, but the absence of extraintestinal air does not exclude the diagnosis. Immediate laparotomy is done to identify and excise the segment of colon containing the perforation and Hartmann's procedure is done.

**Obstruction**

Intestinal obstruction associated with diverticular disease occurs by narrowing of the sigmoid due to the muscular hypertrophy of the bowel wall; or by infection and inflammation aspect of diverticulitis.

**Inflammatory Bowel Disease**

**Epidemiology**

Inflammatory bowel disease includes

- *Ulcerative colitis*
- *Crohn's disease*
- *Indeterminate colitis*

**Figure 12 ULCERATIVE COLITIS**

## Pathology and Differential Diagnosis

Ulcerative colitis and Crohn's colitis share many pathologic and clinical similarities. In ulcerative colitis the colonic mucosa and submucosa are infiltrated with inflammatory cells. The mucosa may be atrophic and crypt abscesses are common. Colonoscopy shows the mucosa is friable and may possess multiple inflammatory pseudopolyps. In long-standing colitis, the colon may be shortened and the mucosa replaced by scar. Ulcerative colitis may affect the rectum (proctitis); rectum and sigmoid colon (proctosigmoiditis); rectum and left colon (left-sided colitis); or the rectum and entire colon (pancolitis). Small intestine is not involved, but the terminal ileum may demonstrate inflammatory changes ("backwash ileitis"). A characteristic feature of

ulcerative colitis is the continuous involvement of the rectum and colon, whereas rectal sparing or skip lesions are characteristic of Crohn's disease. Patients typically presents with bloody diarrhoea, crampy abdominal pain and tenesmus. Severe abdominal pain and fever raises the concern of *fulminant colitis* or *toxic megacolon*.

Crohn's disease is characterised by transmural inflammatory process that can affect any part of the gastrointestinal tract from mouth to anus. The characteristic histological features are mucosal ulcerations, an inflammatory cell infiltrate, and noncaseating granulomas. Chronic inflammation leads to fibrosis, strictures, and fistulas in either the colon or small intestine. The colonoscopic appearance of Crohn's colitis is deep serpiginous ulcers and a "cobblestone" appearance. Acute inflammation may produce diarrhea, crampy abdominal pain and fever; strictures may produce obstruction. Weight loss is a prominent symptom and it is due to obstruction and protein loss. Perianal Crohn's disease presents with fistulas or abscesses.

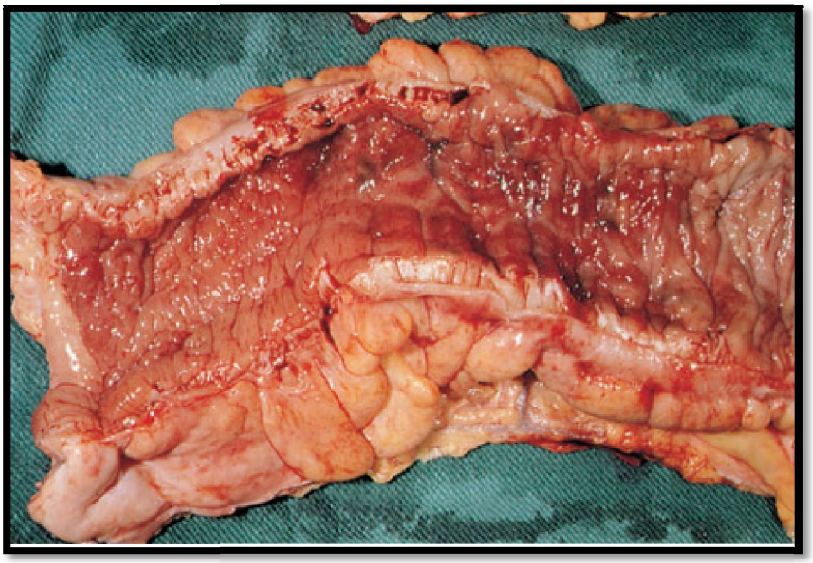

**Figure 13 CROHN'S COLITIS**

## Extraintestinal Manifestations

The liver is a common site of extraintestinal disease in inflammatory bowel disease characterised by fatty infiltration and cirrhosis of the liver. Primary sclerosing cholangitis is characterized by intra and extrahepatic bile duct strictures. Arthritis, Erythema nodosum, Pyoderma gangrenosum can also occur. Ocular involvement includes uveitis, iritis, episcleritis, and conjunctivitis.

## Principles of Nonoperative Management

Medical management includes decreasing inflammation and alleviating symptoms. Mild to moderate flares may be treated in the outpatient setting, whereas more severe signs and symptoms mandate

hospitalization. Ulcerative proctitis and proctosigmoiditis are treated with topical application of salicylate and/or corticosteroid suppositories and enemas.

**Salicylates**

Sulfasalazine (Azulfidine), 5-ASA, and related compounds are first-line drugs in the medical treatment of mild to moderate inflammatory bowel disease.

**Antibiotics**

Antibiotics are used to decrease the intraluminal bacterial load in Crohn's disease. Metronidazole may improve Crohn's colitis and perianal disease, but the evidence is weak. Fluoroquinolones can also be effective in some cases.

**Corticosteroids**

Corticosteroids (either oral or parenteral) are used in treatment of acute exacerbation of either ulcerative colitis or Crohn's disease.

Newer agents such as budesonide, beclomethasone dipropionate, and tixocortol pivalate undergo rapid hepatic degradation, which significantly decreases systemic toxicity.

**Immunosuppressive Agents**

Azathioprine and 6-mercaptopurine are antimetabolite drugs that interfere with nucleic acid synthesis and thus decrease proliferation of inflammatory cells; are useful for treating ulcerative colitis and Crohn's disease in patients who have failed salicylate therapy; or who are dependent upon or refractory to corticosteroids; however, that the onset of action of these drugs takes 6 to 12 weeks, and concomitant use of corticosteroids almost always is required.

Cyclosporine is an immunosuppressive agent that is not routinely used to treat inflammatory bowel disease; however, up to 80% of patients with an acute flare of ulcerative colitis will improve with its use. Methotrexate is a folate antagonist that can also be used to treat inflammatory bowel disease; there are reports that more than 50% of patients will improve with administration of this drug.

Infliximab (Remicade) is a monoclonal antibody against tumor necrosis factor alpha; IV infusion of this agent decreases inflammation systemically.

## Nutrition

Patients with inflammatory bowel disease are often malnourished. Abdominal pain and obstructive symptoms may decrease oral intake; diarrhea can cause significant protein loss; ongoing inflammation produces a catabolic physiologic state. In extremely malnourished patients creation of a stoma often is safer than a primary anastomosis.

## Indications for Surgery

Emergency surgery is required for patients with massive life-threatening *hemorrhage*, *toxic megacolon and fulminant colitis*. Patients with should be treated aggressively with bowel rest, hydration, broad-spectrum antibiotics, and parenteral corticosteroids; colonoscopy and barium enema are contraindicated; and antidiarrheal agents should be avoided. Any deterioration in clinical condition or failure to improve within 24 to 48 hours mandates surgery.

Indications for elective surgery are intractability despite maximal medical therapy and development of major complications of medical therapy. Elective surgery is also indicated in patients at significant risk of developing colorectal carcinoma.

In Crohn's disease, it is impossible to remove the entire at-risk intestine; therefore, surgical therapy is reserved for complications of the disease. Several principles should guide intraoperative decision making; a laparotomy for Crohn's disease should be done through a *midline incision* because of the possible need for a stoma; because many patients with Crohn's disease will require multiple operations, *the length of bowel removed should be minimized*; bowel should be resected to an area with *grossly normal margins*; a primary anastomosis may be safely created if the patient is medically stable, nutritionally replete, and taking few immunosuppressive medications. *Creation of a stoma should be strongly considered* in any patient who is hemodynamically unstable, septic, malnourished or receiving high-dose immunosuppressive therapy and in patients with extensive intra-abdominal contamination.

**Anal and Perianal Crohn's Disease**

Anal or perianal disease occurs in 35% of all patients with Crohn's disease; isolated anal Crohn's disease is uncommon, affecting only 3 to 4% of patients so detection of anal Crohn's disease, therefore, should prompt evaluation of the remainder of the GI tract.

The most common perianal lesions in Crohn's disease are *skin tags* that are minimally symptomatic. *Fissure in ano* is also common.

*Perianal abscess* and *fistulas* are common; and can be particularly challenging. They complex and often have multiple tracts. Treatment of perianal Crohn's disease focuses on alleviation of symptoms. In general, skin tags and hemorrhoids should *not* be excised unless they are extremely symptomatic because there is risk of creating chronic, nonhealing wounds.

Recurrent abscess or complex anal fistulas should raise the possibility of Crohn's disease. Treatment includes *control of sepsis*, *delineation of complex anatomy*, *treatment of underlying mucosal disease*, and *sphincter preservation*. Proinflammatory cytokines such as interleukin-12 and interferon are potential targets.

**Adenocarcinoma and Polyps**

**Incidence**

Colorectal carcinoma is the most common malignancy of the GI tract; over 150,000 new cases are diagnosed annually in the United States; and more than 52,000 patients die of this disease each year, making colorectal cancer the second most common cause of cancer death in the United States. The incidence is similar in men and women. Early detection by screening methods and improvements in medical and

surgical care are thought to be responsible for the decreasing mortality of colorectal cancer observed in recent years.

## Epidemiology (Risk Factors)

Identification of risk factors for development of colorectal cancer is essential to establish screening and surveillance programs in appropriately targeted populations.

## Aging

Aging is the most important risk factor for colorectal cancer, with incidence rising steadily after age 50 years.

## Hereditary Risk Factors

Approximately 80% of colorectal cancers occur sporadically and 20% arise in patients with a known family history of colorectal cancer.

## Environmental and Dietary Factors

Diets high in animal fat and low in fibre contribute to carcinogenesis. In contrast, a diet high in *vegetable fibre* appears to be protective. Ingestion of calcium, selenium, vitamins A, C, and E, carotenoids, and plant phenols have shown to decrease the risk of

developing colorectal cancer. Obesity and sedentary lifestyle also increase cancer-related mortality in colorectal carcinoma.

**Inflammatory Bowel Disease**

Patients with long-standing colitis from inflammatory bowel disease are at increased risk for the development of colorectal cancer; other factors thought to increase risk include the presence of primary sclerosing cholangitis and family history of colorectal cancer. In ulcerative colitis, the risk of malignancy is approximately 2% after 10 years, 8% after 20 years, and 18% after 30 years; patients with Crohn's pancolitis have similar risk.

**Other Risk Factors**

Cigarette smoking is associated with an increased risk of colonic adenomas. Patients undergone ureterosigmoidostomy are also at increased risk for both adenoma and carcinoma formation. Acromegaly is associated with increased levels of circulating human growth hormone and insulin-like growth factor I, increases risk for colorectal carcinoma.

## Polyps

The majority of colorectal carcinomas evolve from adenomatous polyps; this sequence of events is the *adenoma–carcinoma sequence*. *Polyp* is a nonspecific clinical term that describes any projection from the surface of the intestinal mucosa regardless of its histologic nature. Colorectal polyps may be classified as

- *neoplastic* (*tubular adenoma*, *villous adenoma*, *tubulovillous adenomas*)
- *hamartomatous* (*juvenile*, *Peutz-Jeghers*, *Cronkite-Canada*)
- *inflammatory* (*pseudopolyp*, *benign lymphoid polyp*)
- *hyperplastic*

**Figure 14 MULTIPLE SESSILE POLYPS**

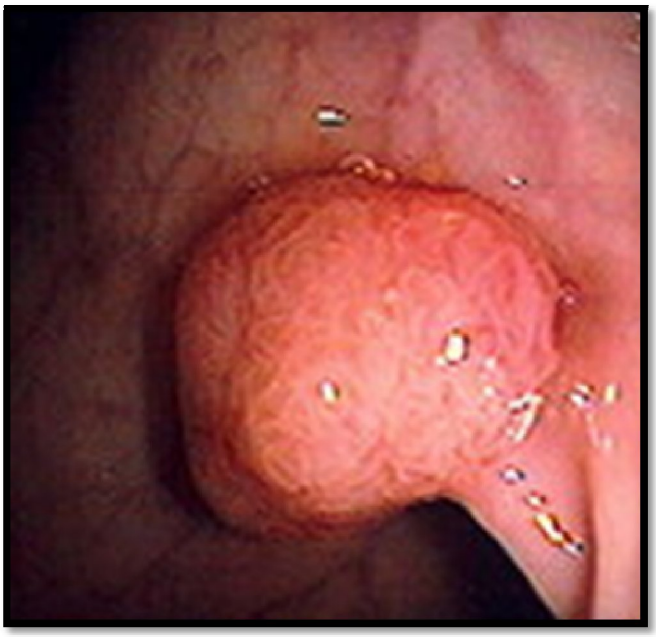

**Figure 15 PEDENCULATED POLYP**

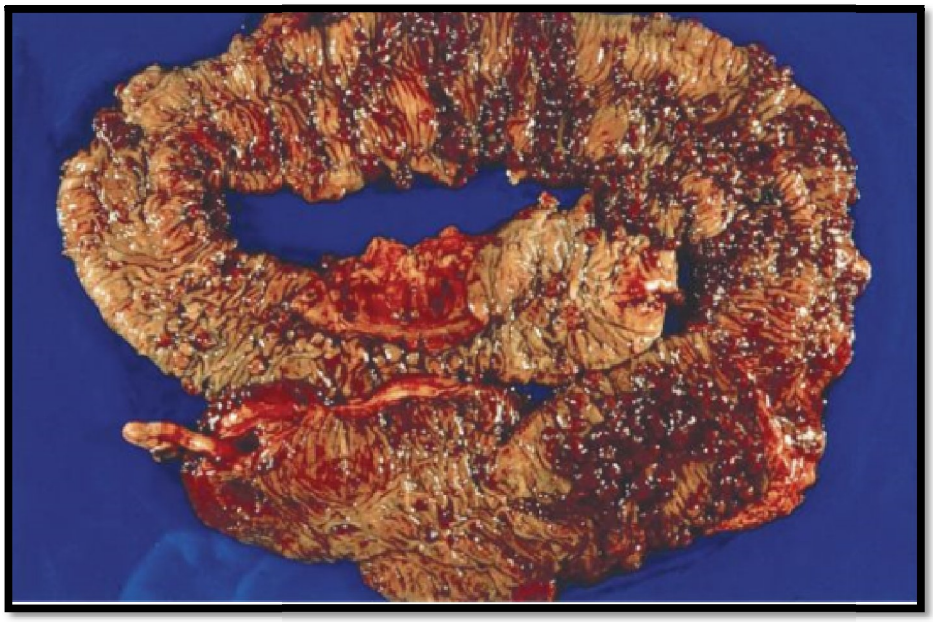

**Figure 16 FAP SHOWING INNUMERABLE COLONIC POLYPS**

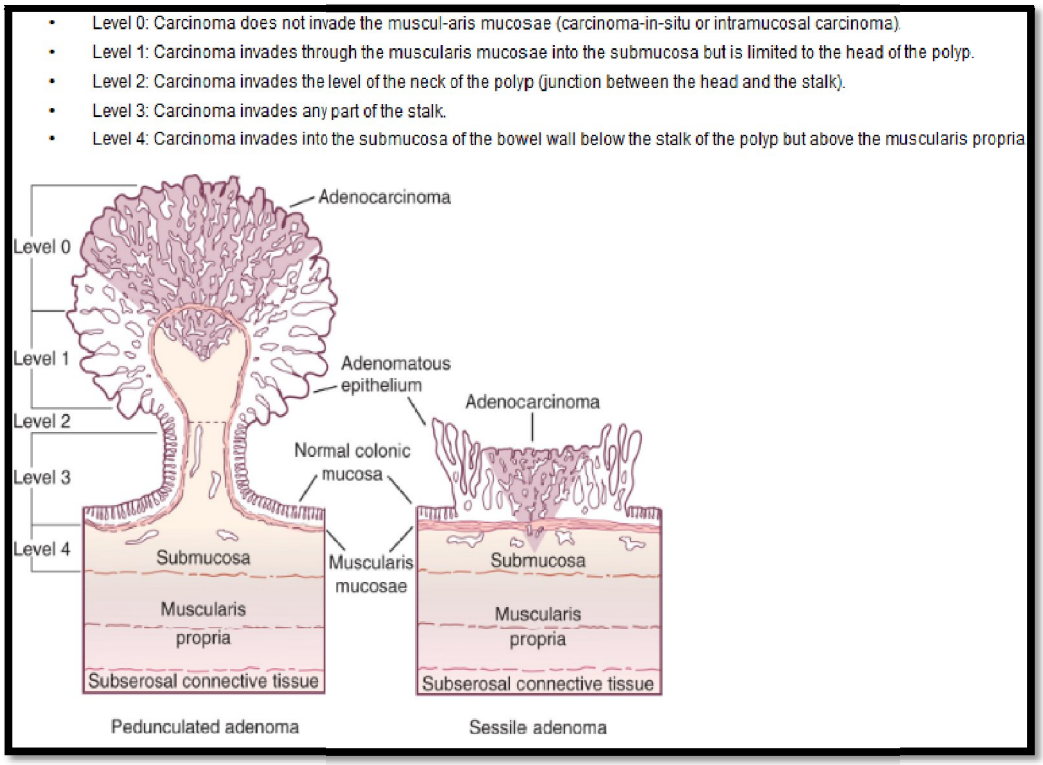


**Figure 17 HAGGITT'S CLASSIFICATION OF TUMOR INVASION IN PEDUNCULATED OR SESSILE POLYP**

Three operative procedures can be considered: total proctocolectomy with either an end (Brooke) ileostomy or continent (Kock) ileostomy; total abdominal colectomy with ileorectal anastomosis; and restorative proctocolectomy with ileal pouch–anal anastomosis with or without a temporary ileostomy. The administration of COX-2 inhibitors (celecoxib, sulindac) has shown to slow or prevent the development of polyps.

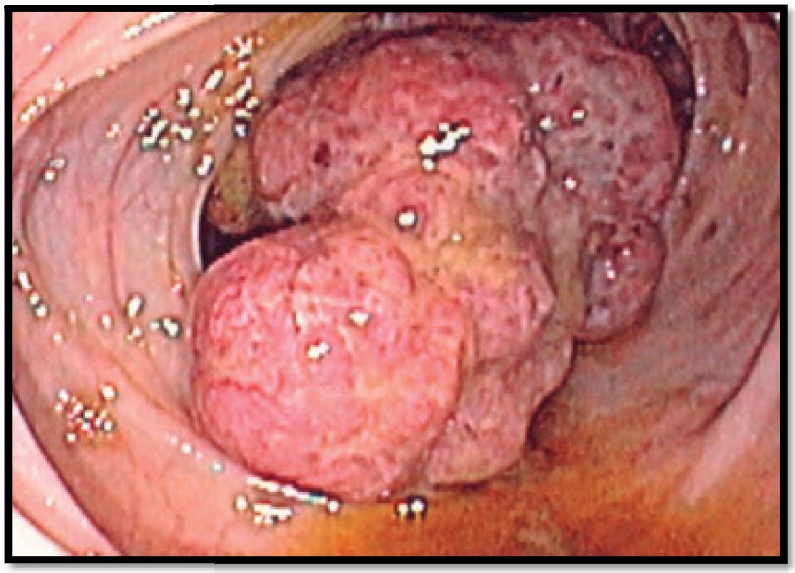

**Figure 18 OBSTRUCTIVE GROWTH IN THE COLON**

FAP may be associated with extraintestinal manifestations such as congenital hypertrophy of the retinal pigmented epithelium, desmoid tumors, epidermoid cysts, mandibular osteomas (Gardner's syndrome); and central nervous system tumors (Turcot's syndrome).

**Hereditary Nonpolyposis Colon Cancer (Lynch Syndrome)**

HNPCC (or Lynch syndrome) is also rare (1 to 3%). The genetic defects associated with HNPCC arise from errors in *mismatch repair*. HNPCC is inherited in an autosomal dominant pattern; and is characterized by the development of colorectal carcinoma at an early age (average age: 40 to 45 years). About 70% of affected individuals will develop colorectal cancer. The risk of synchronous or

metachronous colorectal carcinoma is 40%. HNPCC is associated with extracolonic malignancies, including endometrial, which is most common, ovarian, pancreas, stomach, small bowel, biliary, and urinary tract carcinomas. The *Amsterdam criteria* for clinical diagnosis of HNPCC are three affected relatives with histologically verified adenocarcinoma of the large bowel (one must be a first-degree relative of one of the others) in two successive generations of a family with one patient diagnosed before age 50 years.

Screening colonoscopy is recommended annually for at-risk patients beginning at either age 20 to 25 years or 10 years younger than the youngest age at diagnosis in the family, whichever comes first. Because of the high risk of endometrial carcinoma, transvaginal ultrasound or endometrial aspiration biopsy should be done annually after age 25 to 35 years. There is a 40% risk of developing a second colon cancer, so total colectomy with ileo-rectal anastomosis is recommended once adenomas or a colon carcinoma is diagnosed, or if prophylactic colectomy is decided upon. Prophylactic hysterectomy and bilateral salpingo-oophorectomy should be considered in women who have completed childbearing.

## Familial Colorectal Cancer

Nonsyndromic familial colorectal cancer accounts for 10 to 15% of patients with colorectal cancer. Screening colonoscopy is recommended every 5 years beginning at age 40 years or beginning 10 years before the age of the earliest diagnosed patient in the pedigree.

## Prevention: Screening and Surveillance

| Advantages and Disadvantages of Screening Modalities for Asymptomatic Individuals | | |
|---|---|---|
| | **Advantages** | **Disadvantages** |
| Fecal occult blood testing | Ease of use and noninvasive | May not detect most polyps |
| | Low cost | Low specificity |
| | Good sensitivity with repeat testing | Colonoscopy required for positive result |
| | | Poor compliance with serial testing |
| Sigmoidoscopy | Examines colon most at risk | Invasive |
| | Very sensitive for polyp detection in left colon | Uncomfortable |
| | | Slight risk of perforation or bleeding |
| | Does not require full bowel preparation (enemas only) | May miss proximal lesions |
| | | Colonoscopy required if polyp identified |

| | | |
|---|---|---|
| Colonoscopy | Examines entire colon | Most invasive |
| | Highly sensitive and specific | Uncomfortable and requires sedation |
| | Therapeutic | Requires bowel preparation |
| | | Risk of perforation or bleeding |
| | | Costly |
| Double-contrast barium enema | Examines entire colon | Requires bowel preparation |
| | Good sensitivity for polyps >1 cm | Less sensitivity for polyps <1 cm |
| | | May miss lesions in the sigmoid colon |
| | | Colonoscopy required for positive result |
| Computed tomographic colonography (virtual colonoscopy) | Examines entire colon | Requires bowel preparation |
| | Noninvasive | Insensitive for small polyps |
| | Sensitivity may be as good as colonoscopy | Minimal experience and data |
| | | Colonoscopy required for positive result |
| | | Costly |

| Screening Guidelines for Colorectal Cancer | | |
|---|---|---|
| **Population** | **Initial Age** | **Recommended Screening Test** |
| Average risk | 50 y | Annual FOBT or |
| | | Flexible sigmoidoscopy every 5 y or |
| | | Annual FOBT and flexible sigmoidoscopy every 5 y or |
| | | Air-contrast barium enema every 5 y or |
| | | Colonoscopy every 10 y |
| Adenomatous polyps | 50 y | Colonoscopy at first detection; then colonoscopy in 3 y |
| | | If no further polyps, colonoscopy every 5 y |
| | | If polyps, colonoscopy every 3 y |
| | | Annual colonoscopy for >5 adenomas |
| Colorectal cancer | At diagnosis | Pretreatment colonoscopy; then at 12 mo after curative resection; then colonoscopy after 3 y; then colonoscopy every 5 y, if no new lesions |

| | | |
|---|---|---|
| Ulcerative colitis, Crohn's colitis | At diagnosis; then after 8 y for pancolitis, after 15 y for left-sided colitis | Colonoscopy with multiple biopsies every 1–2 y |
| FAP | 10–12 y | Annual flexible sigmoidoscopy |
| | | Upper endoscopy every 1–3 y after polyps appear |
| Attenuated FAP | 20 y | Annual flexible sigmoidoscopy |
| | | Upper endoscopy every 1–3 y after polyps appear |
| HNPCC | 20–25 y | Colonoscopy every 1–2 y |
| | | Endometrial aspiration biopsy every 1–2 y |
| Familial colorectal cancer first-degree relative | 40 y or 10 y before the age of the youngest affected relative | Colonoscopy every 5 y |
| | | Increase frequency if multiple family members are affected, especially before 50 y |

FAP = familial adenomatous polyposis; FOBT = fecal occult blood testing; HNPCC = hereditary nonpolyposis colon cancer.

| TNM Staging of Colorectal Carcinoma | |
|---|---|
| **Tumor stage (T)** | **Definition** |
| **TX** | Cannot be assessed |
| **T0** | No evidence of cancer |
| **Tis** | Carcinoma in situ |
| **T1** | Tumor invades submucosa |
| **T2** | Tumor invades muscularis propria |
| **T3** | Tumor invades through muscularis propria into subserosa or into nonperitonealized pericolic or perirectal tissues |
| **T4** | Tumor directly invades other organs or tissues or perforates the visceral peritoneum of specimen |
| **Nodal stage (N)** | |
| **NX** | Regional lymph nodes cannot be assessed |
| **N0** | No lymph node metastasis |
| **N1** | Metastasis to one to three pericolic or perirectal lymph nodes |
| **N2** | Metastasis to four or more pericolic or perirectal lymph nodes |
| **N3** | Metastasis to any lymph node along a major named vascular trunk |
| **Distant metastasis (M)** | |
| **MX** | Presence of distant metastasis cannot be assessed |
| **M0** | No distant metastasis |
| **M1** | Distant metastasis present |

| TNM Staging of Colorectal Carcinoma and 5-Year Survival | | |
|---|---|---|
| **Stage** | **TNM** | **5-Y Survival (%)** |
| **I** | T1–2, N0, M0 | 70–95 |
| **II** | T3–4, N0, M0 | 54–65 |
| **III** | T*any*, N1–3, M0 | 39–60 |
| **IV** | T*any*, N*any*, M1 | 0–16 |

**Stage-Specific Therapy**

**Stage 0 (Tis, N0, M0)**

The presence of high-grade dysplasia increases the risk of finding an invasive carcinoma within the polyp; for this reason, these polyps should be excised completely and pathologic margins should be free of dysplasia.

**Stage I: The Malignant Polyp (T1, N0, M0)**

Treatment of a *malignant polyp* is based upon the risk of local recurrence and the risk of lymph node metastasis; the risk of lymph node metastases depends primarily upon the depth of invasion. Invasive carcinoma in the head of a pedunculated polyp with no stalk involvement carries a low risk of metastasis (<1%); and may be completely resected endoscopically. Invasive carcinoma in a sessile

polyp extends into the submucosa and is usually best treated with segmental colectomy.

**Stages I and II: Localized Colon Carcinoma (T1–3, N0, M0)**

The majority of patients with stages I and II colon cancer will be cured with surgical resection; adjuvant chemotherapy has been suggested for selected patients with stage II disease (young patients, tumors with "high-risk" histologic findings).

**Stage III: Lymph Node Metastasis (T*any*, N1, M0)**

Patients with lymph node involvement are at significant risk for both local and distant recurrence; and adjuvant chemotherapy has been recommended routinely in these patients. 5-fluorouracil based regimens (with levamisole or leucovorin) reduce recurrences and improve survival in this patient population; newer chemotherapeutic agents such as capecitabine, irinotecan, oxaliplatin, angiogenesis inhibitors and immunotherapy also show promise.

**Stage IV: Distant Metastasis (T*any*, N*any*, M1)**

Survival is extremely limited in stage IV colon carcinoma. Highly selected patients with isolated, resectable metastases may benefit from resection (metastasectomy). Commonest site of metastasis is the liver;

of these, 20% are potentially resectable for cure; survival is improved in these patients (20 to 40% 5-year survival) when compared to patients who do not undergo resection. All patients require adjuvant chemotherapy. All other patients with stage IV disease cannot be cured surgically; and therefore, the focus of treatment should be palliation. Resection of the primary tumor has been recommended to prevent complications such as obstruction and bleeding.

**Follow-Up and Surveillance**

Patients treated for colorectal cancer, are at risk for the development of recurrent disease (either locally or systemically) or metachronous disease (a second primary tumor). Metachronous cancers should be preventable by using surveillance colonoscopy to detect and remove polyps before they progress to invasive cancer. A colonoscopy should be performed within 12 months after the diagnosis of the original cancer and should be repeated every 3 to 5 years thereafter.

CEA often is followed every 2 to 3 months for 2 years. CT scans are done if CEA is elevated. More intensive surveillance is appropriate in high-risk patients such as those with possible HNPCC syndrome or T3 N + cancers.

**Solitary rectal ulcer**

Solitary rectal ulcer syndrome is usually associated with internal intussusception. The symptoms are pain, bleeding, mucus discharge, or outlet obstruction. In solitary rectal ulcer syndrome, one or more ulcers are present in the distal rectum, usually on the anterior wall. Invetigations to be done are anorectal manometry, defecography, and colonoscopy or barium enema to exclude other diagnoses. Biopsy of an ulcer or mass is essential to exclude malignancy. Conservative therapy (high-fiber diet, defecation training to avoid straining, and laxatives or enemas) is effective in the majority of patients. Surgery is reserved for highly symptomatic patients for whom all other medical interventions have failed.

## LOWER GASTROINTESTINAL ENDOSCOPY

Indications for colonoscopy – generally indicated according to the 2000 ASGE guidelines[6]

| |
|---|
| Hematochezia |
| Clinically significant diarrhoea of unexplained origin |
| Irritable bowel syndrome or chronic abdominal pain: colonoscopy done once to rule out organic disease |
| Inflammatory bowel disease |
| Unexplained iron deficiency anaemia |
| Surveillance for patients who underwent removal polyp |
| Colonoscopy to remove synchronous neoplastic lesions at or around time of curative resection of cancer followed by colonoscopy at 3 years and 3-5 years thereafter to detect metachronous cancer |
| Evaluation of an abnormality on barium enema or other imaging study, which is likely to be clinically significant, such as a filling defect or stricture |
| Presence of fecal occult blood |
| Examination to evaluate the entire colon for synchronous cancer or neoplastic polyps in a patient with treatable cancer or neoplastic polyp |

| |
|---|
| Excision of colonic polyp |
| Balloon dilation of stenotic lesions (e.g., anastomotic strictures) |
| Melena after an upper GI source has been excluded |
| In patients with ulcerative or Crohn's pancolitis eight or more years' duration or left sided colitis or more years' duration every 1-2 years with systematic biopsies to detect dysplasia |
| Treatment of bleeding from such lesions as vascular malformation, ulceration, neoplasia, and polypectomy site (e.g., electrocoagulation, heater probe, laser or injection therapy) |
| Family history of sporadic colorectal cancer before the age of 60: colonoscopy every 5 years beginning at the age of 10 years earlier than the affected relative or every three years if adenoma is found |
| Intraoperative identification of a lesion not apparent at surgery |
| Family history of hereditary non-polyposis colorectal cancer: colonoscopy every two years beginning at the age of or five years younger than the earliest age of diagnosis of colorectal cancer. Annual colonoscopy beginning at the age of 40 |
| Palliative treatment of stenosing or bleeding neoplasms (e.g., laser, electrocoagulation, stenting) |

Indications for colonoscopy – generally not indicated according to the 2000 ASGE guidelines[6]

| |
|---|
| **Chronic, stable, irritable bowel syndrome or chronic abdominal pain** |
| **Routine follow-up of inflammatory bowel disease** |
| **Acute diarrhea** |
| **Metastatic adenocarcinoma of unknown primary site in the absence of colonic signs or symptoms when it will not influence management** |
| **Upper GI bleeding or melena with a demonstrated upper gastrointestinal source** |

## BOWEL PREPARATION FOR LOWER GI ENDOSCOPY

Accuracy of diagnosis and safety of the procedure depends on the ability to see the colonic lumen clearly which requires a good bowel preparation.[7] The ideal preparation for lower gastrointestinal endoscopy would be a empty colon without faecal material; with no gross histological alteration of the colonic mucosa. The ideal preparation should not cause any discomfort for the patient or alterations in fluids and electrolytes; and should not be expensive; however none of the preparations currently available meet all of these requirements.

# REGIMENS FOR BOWEL PREPARATION FOR COLONOSCOPY

## Diet

Dietary regimens ARE clear liquids and low-residue foods during one to four days prior to the procedure. It also includes oral cathartic and/or additional cathartic enemas a day before the procedure. Tap water enemas are given on the morning of the procedure and also occasionally on the evening before the procedure.

## Enemas

Tap water or sodium phosphate enemas are administered on the evening before or the morning of the procedure.

## PEG (electrolyte lavage solution)

PEG, a nonabsorbable solution that passes through the bowel without any net absorption or secretion is used on the morning of the procedure or the previous evening. There is no significant fluid and electrolyte shifts. But large volumes (2-4 litres) are required to achieve a cathartic effect.

**Sulphate-free PEG (SF-PEG)**

PEG-based lavage solutions without sodium sulfate was developed by Fordtran et al basically to improve the palatability, smell and taste of PEG solutions. The improved tastes were the result of a decrease in potassium concentration; increase in chloride concentration; and also complete absence of sodium sulphate.

**Bisacodyl**

Bisacodyl is a poorly absorbed diphenylmethane which stimulates colonic peristalsis. It shortens the duration of whole gut irrigation. But there is no significant difference in colon cleansing was identified.

**Inadequate bowel preparation**

Inadequate bowel preparation for colonoscopy can result in missed lesions, cancelled procedures, increased procedural time, and a potential increase in complication rates.

**INFORMED CONSENT**

The essential elements in the informed consent[8] are

1. The patient's pertinent medical diagnosis and test results.

2. The nature of the proposed procedure.

3. The reason the procedure is being suggested.

4. The benefits of the procedure.

5. The risks and complications of the procedure, including the relative incidence and severity, which would be material to the patient's decision-making process.

6. Reasonable alternatives to the proposed procedure.

7. The patient's prognosis if the treatment or test is declined.

**PROCEDURE**

During the procedure the patient is administered a sedative intravenously. Agents used for sedation are fentanyl and midazolam.[9] Meperidine can also be used as an alternative to fentanyl, but complications such as seizures makes it second line drug to fentanyl and midazolam.[9] Propofol can be used in alternative to midazolam, which gives the patient quicker recovery. It is gaining wider use, but requires closer monitoring of respiration. A meta-analytic study has found that playing music improves patient tolerability of the procedure.[10] The procedure starts with patient in comfortable left lateral decubitus position. The first step is to do a thorough digital rectal examination (DRE) to assess the tone of the sphincter; and to determine if preparation has been adequate. The colonoscope or the sigmoidoscope

is then passed through the anus, the rectum, the sigmoid colon, descending colon, the splenic flexure, the transverse colon, the ascending colon, the cecum and through the ileo-caecal valve to the terminal ileum. The endoscope has a twistable and mobile tip and separate channels each for instrumentation, insufflation of air, suction, camera and light. The bowel insufflated with air to maximize visibility which gives a sense of discomfort and sense of defaecation to the patient. During the procedure, the mucosal and vascular pattern of the entire large is carefully examined for any pathology. Suspicious lesions can be biopsied. In most experienced hands, the procedure can be completed in 10 minutes in 95% of cases. The difficulties encountered are tight turns and redundancy in areas of the colon that are not fixed, loops may form in which advancement of the endoscope creates a "bowing" effect that causes the tip to actually retract. This results in discomfort due to stretching of the colon and its mesocolon. This can be manoeuvred pulling the endoscope backwards while torquing the instrument. Alternatively, the position of the patient can be changed and external hand pressure over the abdomen can often straighten the endoscope to allow the scope to move forward. Looping of the scope is often cited as a cause for an incomplete examination. A closer visual

inspection is then often performed upon withdrawal of the endoscope over the course of 20 to 25 minutes.

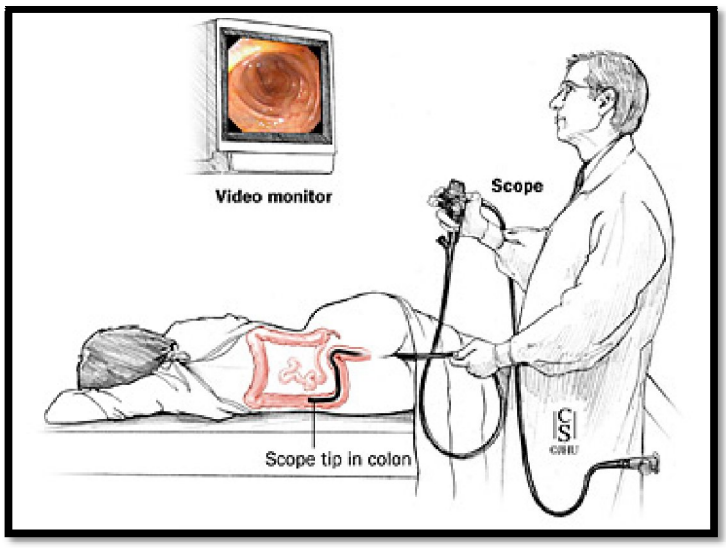


**Figure 19 COLONOSCOPY SETUP**

On an average the procedure takes 20–30 minutes depending on the indication and findings. After the procedure some recovery time is usually allowed to let the sedative wear off.[9] Outpatient recovery time can take an estimate of 30–60 minutes.

## COMPLICATIONS

Although up to 33% of patients report at least one minor, transient GI symptom after colonoscopy, serious complications are uncommon. Over 85% of the serious colonoscopy complications are reported in patients undergoing colonoscopy with polypectomy.[11, 12]

**Abdominal discomfort/ Pain**

The most commonly reported complications of colonoscopy are bloating (25%) and abdominal pain and/or discomfort 5% to 11%.[11, 12] This can be avoided by avoiding and reducing endoscope looping and minimizing air insufflation should help reduce these symptoms.

**Cardiopulmonary Complications**

Cardiopulmonary complications have been defined to include events ranging from minor fluctuations in oxygen saturation or heart rate, to significant complications including respiratory arrest, cardiac arrhythmias, myocardial infarction, and shock.[14] The risk of cardiopulmonary events associated with colonoscopy is increased in old age and in the presence of comorbidities.[14] Appropriate pre-endoscopic assessment of cardiac status may reduce cardiopulmonary complications by ensuring that high-risk patients are co-managed with other specialists (eg, cardiology, anesthesiology); monitoring before, during, and after the procedure also may reduce the risk of complications.

**Perforation**

Colonic perforation may be due to mechanical forces against the bowel wall, barotrauma, or as a direct result of therapeutic procedures.[13]

Early symptoms of perforation include persistent abdominal pain and abdominal distension; later, patients may develop peritonitis. Plain radiographs of the chest and abdomen may demonstrate air under diaphragm, although CT scans have been shown to be superior to the upright chest film.

**Haemorrhage**

Hemorrhage is most often associated with therapeutic procedures such as polypectomy, although it can occur during diagnostic colonoscopy.[13] In polypectomy, hemorrhage may occur immediately or can be delayed for several weeks after the procedure. A number of large studies have reported hemorrhage in 1 to 6 per 1000 colonoscopies (0.1%-0.6%). The rate of GI hemorrhage was significantly different with or without polypectomy: 2.1 per 1000 procedures coded as screening without polypectomy and 3.7 per 1000 for procedures coded as diagnostic without polypectomy, compared with 8.7 per 1000 for any procedures with polypectomy.

**Postpolypectomy electrocoagulation syndrome**

It is due to electrocoagulation injury to the bowel wall that induces a transmural burn which results in localized peritonitis without evidence of perforation on radiographic studies. The incidence of this

complication varies widely from 3 per 100,000 (0.003%) to 1 in 1000 (0.1%).

**Infection**

Transient bacteremia after colonoscopy occurs in approximately 4% of procedures, with a range of 0% to 25%; though signs or symptoms of infection are rare.

**Gas Explosion**

Explosive complications of colonoscopy are rare, reported 9 cases in 2007 review; each resulting in colonic perforation and, in one case, death.[15] Gas explosion occurs when combustible levels of hydrogen or methane gas are present in the colonic lumen, oxygen is present, and electrosurgical energy is used

**Miscellaneous complications**

Miscellaneous complications of colonoscopy are splenic rupture, acute appendicitis, diverticulitis, subcutaneous emphysema, and intraabdominal hemorrhage. Chemical colitis may occur if glutaraldehyde, used during disinfection, has not been adequately rinsed from the endoscope.

## AIM AND OBJECTIVES OF THE STUDY

1. To evaluate the spectrum of clinical findings in lower gastrointestinal endoscopy in patients presenting with altered bowel habits, bleeding per rectum and abdominal pain and to evaluate its diagnostic yield.

2. To analyze the symptomatology in colorectal carcinoma.

## MATERIALS AND METHODS:

### PLACE OF STUDY:

Department of General Surgery,

Government Stanley Medical College and Hospital.

### DURATION:

JULY 2013 TO DEC 2013

### STUDY DESIGN:

Prospective study

**SAMPLE SIZE:** 100 CASES

**INCLUSION CRITERIA:**

1. Patients presenting with altered bowel habits, lower abdominal pain and/or bleeding per rectum.

2. Patients who are diagnosed to have haemorrhoids, fistula in ano and fissure in ano to rule out primary predisposing pathology for the above conditions and to rule out other lower GI pathology.

**EXCLUSION CRITERIA:**

- Patients who are not fit for colonoscopy.
- Patients not willing for lower GI endoscopy.
- Patients with previously established diagnosis.

**METHODOLOGY:**

- The first 100 patients presenting with features of lower abdominal pain, altered bowel habits and/or bleeding per rectum will be enrolled in the study as per the inclusion and exclusion criteria.

- After obtaining informed consent the patients are subjected to a detailed history taking & clinical examination (annexure 1)

- Baseline investigations and cardiac workup for patients >50 years are done to assess the fitness of the patient to undergo lower GI endoscopy.

- Findings that will be considered significant would be premalignant and malignant lesions, inflammatory bowel disease and other colitis, stricture (benign & malignant), angiodysplasia.

- Those that will not be considered significant will be hemorrhoids, fissure in ano and fistula in ano.

- The indications of colonoscopy and the findings in the lower GI endoscopy will be recorded and analysed to evaluate the spectrum of diseases occurring in such patients.

- Diagnostic yield will be defined as the ratio between significant findings detected on colonoscopy and the total no. of procedures performed for the specified indication.

- The results are analyzed using Microsoft Excel for tabular transformation and graphical representation.

# OBSERVATION AND RESULTS

This study was conducted in the Department of General Surgery in Government Stanley Medical College and Hospital, Chennai over a period of one year. The 100 patients presenting with complaints of bleeding per rectum, altered bowel habits, lower abdominal pain or combination of these symptoms, who fulfilled the inclusion criteria were enrolled in this study after obtaining informed consent

**Table 1: Sex distribution of patients undergoing endoscopy**

| SEX | NO. OF PATIENTS | PERCENTAGE % |
|---|---|---|
| MALE | 68 | 68% |
| FEMALE | 32 | 32% |
| TOTAL | 100 | 100% |

Out of 100 patients enrolled for the study 68 patients were male and 22 patients were female

Male:Female ratio – 2.1:1

**Figure 1: Sex distribution**

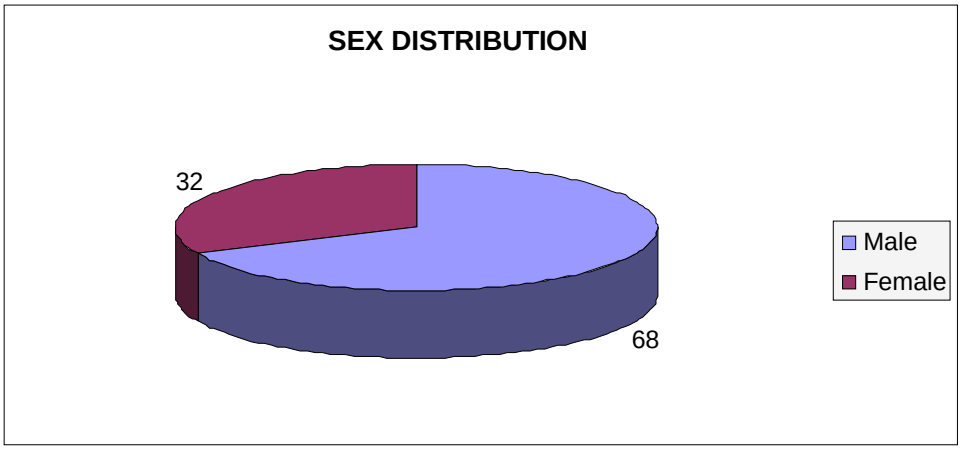


Table 2: Age distribution of patients undergoing endoscopy

| AGE RANGE IN YEARS | NO. OF PATIENTS | PERCENTAGE % |
|---|---|---|
| 20-40 YRS | 32 | 32% |
| 41-60 YRS | 44 | 44% |
| >60 YRS | 24 | 24% |
| TOTAL | 100 | 100% |

The age group of patients enrolled in this study ranges from 20-80 yrs. Most patients (85%) fall in the age group of 20-60 yrs. 15% of patients were above 60 yrs.

**Figure 2: Age distribution of patients undergoing endoscopy**

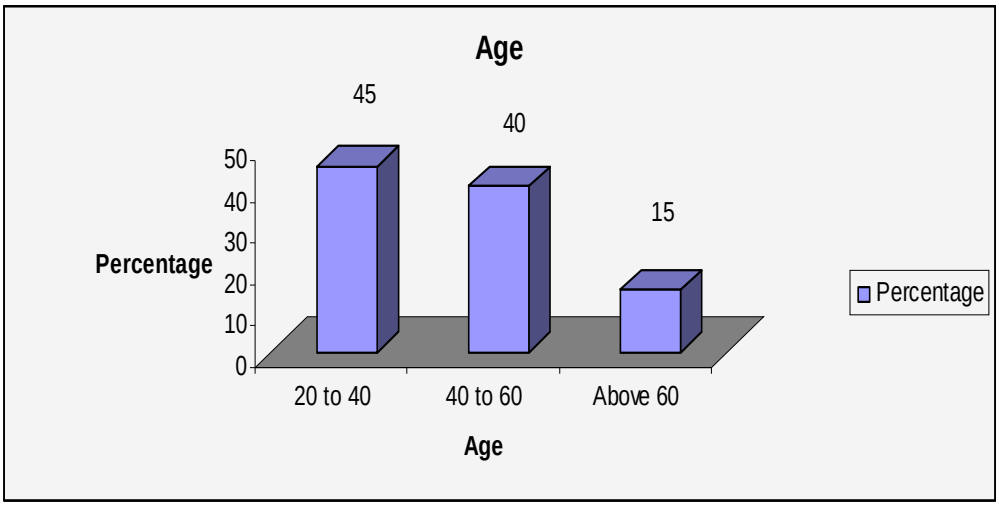


**Table 3: Lower GI endoscopy**

| PROCEDURE | NO. OF PATENTS | PERCENTAGE% |
|---|---|---|
| SIGMOIDOSCOPY | 32 | 32% |
| COLONOSCOPY | 68 | 68% |
| TOTAL | 100 | 100% |

Of the two lower GI endoscopic procedures, colonoscopy (68%) is more commonly done than sigmoidoscopy(32%).

**Figure 3: Lower GI endoscopy**

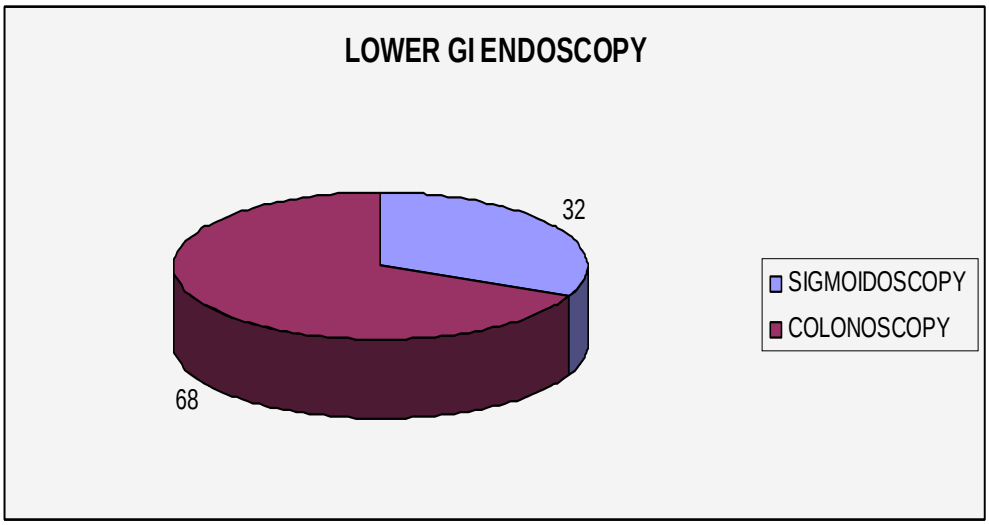


**Table 4: Endoscopy results**

| FINDINGS | NO. OF PATIENTS | PERCENTAGE% |
|---|---|---|
| NORMAL STUDY | 50 | 50% |
| PATHOLOGICAL FINDING | 44 | 44% |
| INCOMPLETE PROCEDURE | 6 | 6% |
| TOTAL | 100 | 100% |

50% of the patients who underwent endoscopy found to have no abnormalities. Positive pathological findings were found in 44% of the patients. Procedure was not completed or deferred in 6% of patients.

**Figure 4: Endoscopy results**

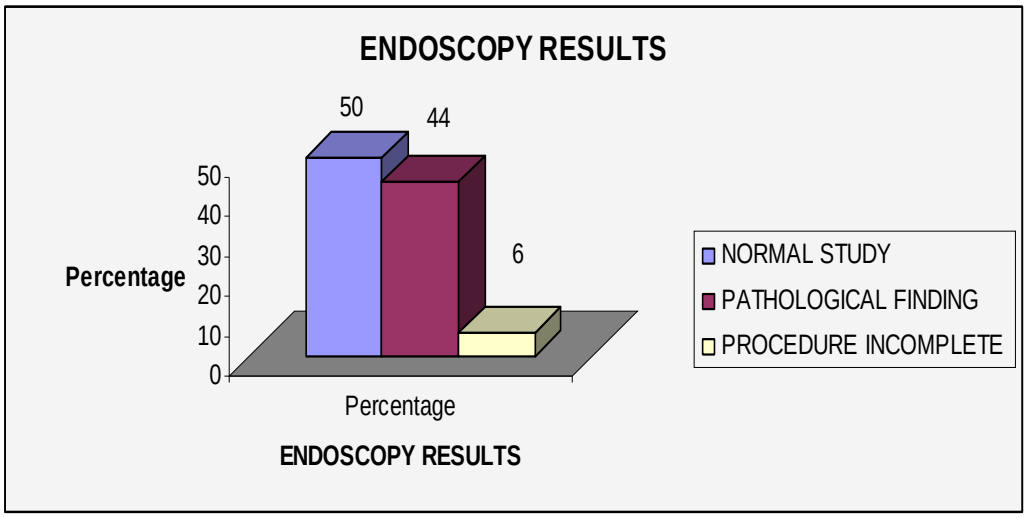


**Table 5: Diagnostic pattern observed in the study**

| PATHOLOGICAL FINDING | NO. OF PATIENTS | PERCENTAGE |
|---|---|---|
| POLYPS | 11 | 25% |
| MALIGNANCY | 25 | 56% |
| ULCERATIVE COLITIS | 2 | 4.5% |
| TUBERCULOSIS | 2 | 4.5% |
| SOLITARY RECTAL ULCER | 2 | 4.5% |
| DIVERTICULAR DISEASE | 2 | 4.5% |

Colorectal malignancy is the most common disease found in the study group (56%). Other major findings in the study group are

colorectal polyps (25%); ulcerative colitis (4.5%); tuberculosis (4.5%); diverticular disease (4.5%); solitary rectal ulcer (4.5%).

**Figure 5: Diagnostic pattern observed in the study**

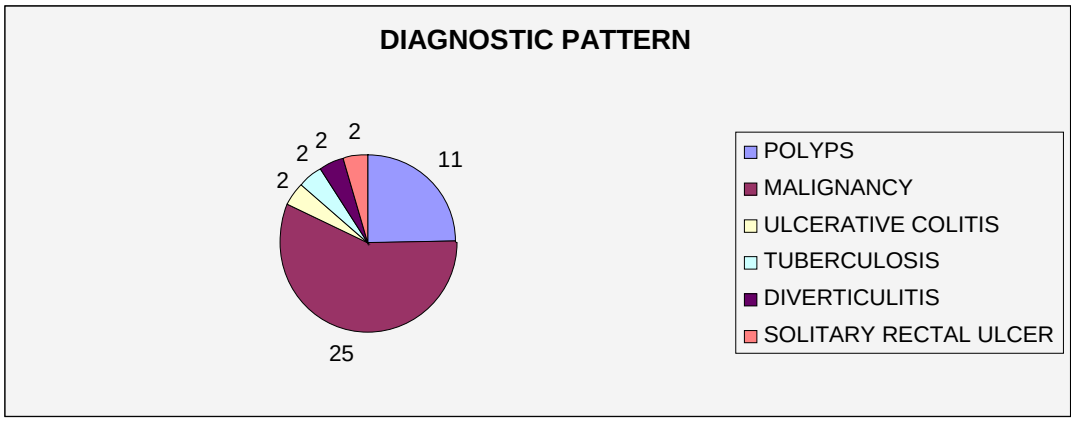


**Table 6: Age distribution in malignancy**

| AGE RANGE IN YEARS | NO. OF PATIENTS | PERCENTAGE% |
|---|---|---|
| 20-40 YRS | 8 | 32% |
| 41-60 YRS | 11 | 44% |
| >60 YRS | 6 | 24% |
| TOTAL | 25 | 100% |

Most common age group of presentation of malignancy is 40-60 yrs (44%). Occurrence of malignancy in age group 20-40 yrs is strikingly 32%; in age group more than 60 yrs is 24%.

**Figure 6: Age distribution in malignancy**

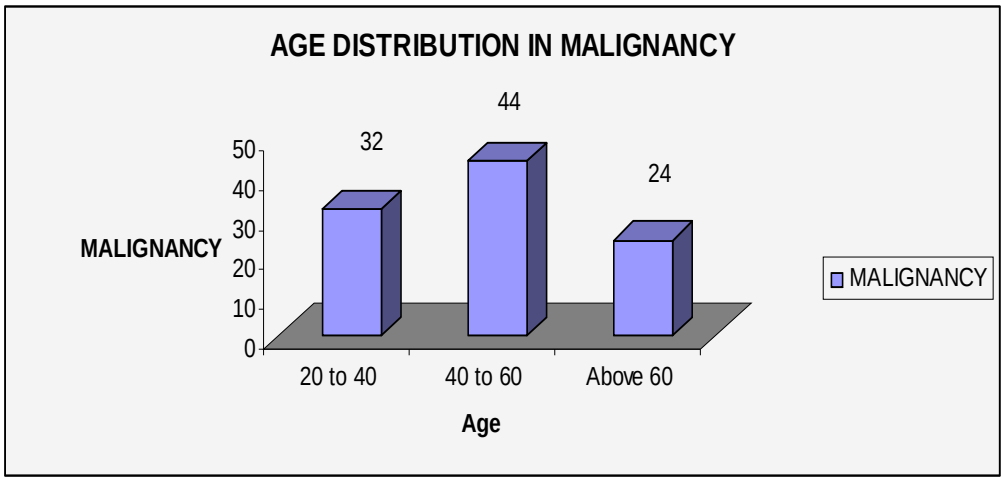


**Table 7: Sex distribution in malignancy**

| SEX | NO. OF PATIENTS | PERCENTAGE% |
|---|---|---|
| MALE | 15 | 60% |
| FEMALE | 10 | 40% |
| TOTAL | 25 | 100% |

Incidence of colorectal malignancy is more common in males than females. Male:Female ratio is 3:2

**Figure 7: Sex distribution in malignancy**

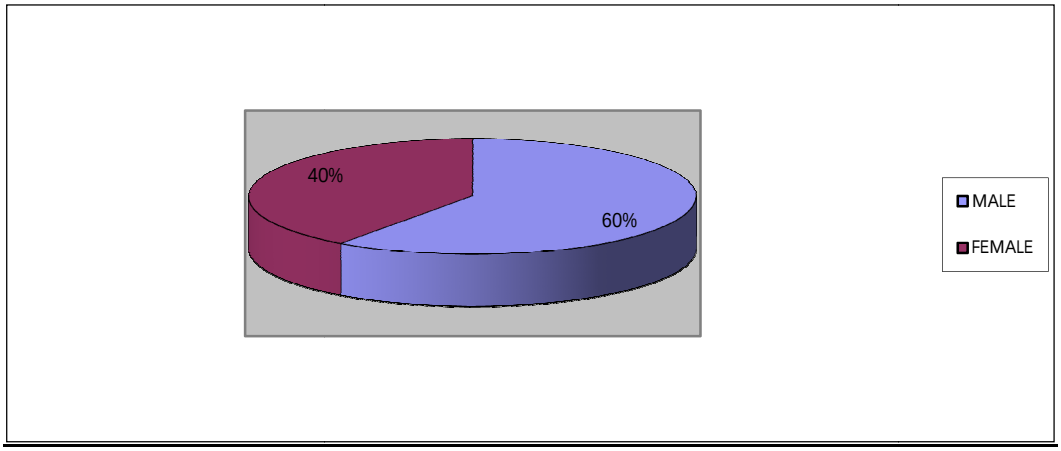


**Table 8: Site of involvement of malignancy**

| SITE OF INVOLVEMENT | NO. OF PATIENTS | PERCENTAGE% |
|---|---|---|
| ANAL CANAL | 3 | 12% |
| RECTUM | 11 | 44% |
| RECTOSIGMOID | 2 | 8% |
| SIGMOID COLON | 5 | 20% |
| DESCENDING COLON | 2 | 8% |
| TRANSVERSE COLON | 0 | 0% |
| ASCENDING COLON | 1 | 4% |
| CAECUM | 1 | 4% |
| TOTAL | 25 | 100% |

Most common site of involvement of colorectal malignancy is rectum (44%), followed by sigmoid (20%). Involvement of anal canal is seen in 12%; recctosigmoid 8%; descending colon 8%; ascending colon 4%; and caecum 4%

**Figure 8: Site of involvement of malignancy**

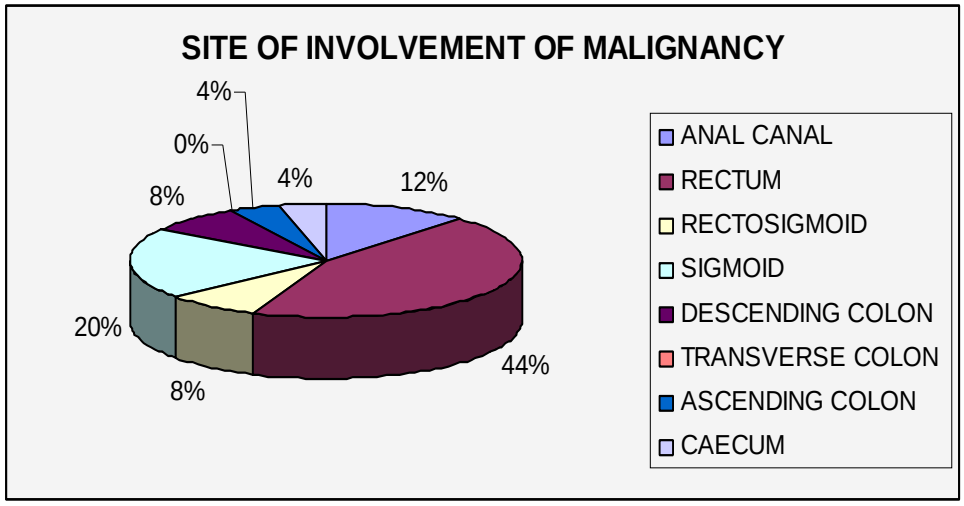


**Table 9: Symptomatology in malignancies**

| SYMPTOM | NO. OF PATIENTS | PERCENTAGE% |
|---|---|---|
| BLEEDING P/R | 21 | 84% |
| ALTERED BOWEL HABITS | 10 | 40% |
| LOWER ABDOMINAL PAIN | 14 | 56% |

Bleeding p/r is seen in 84% of cases of colorectal malignancies. Altered bowel habits are seen in 40% of cases. Lower abdominal pain is seen in 56% of cases.

**Figure 9: Symptomatology in malignancies**

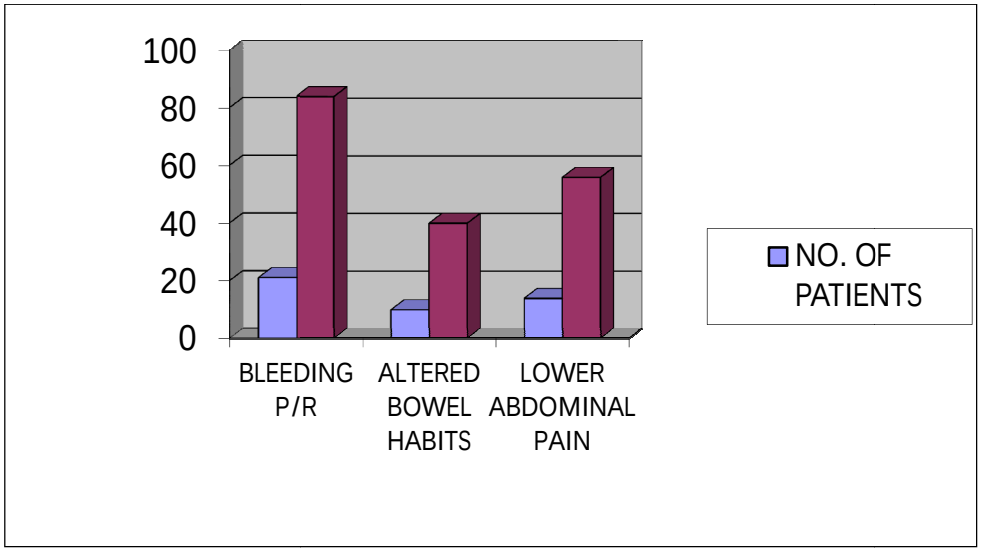


**Table 10: Diagnostic yield of lower GI endoscopy**

| INDICATION | NO. OF PATIENTS | NO. OF ABNORMALITIES | DIAGNOSTIC YIELD |
|---|---|---|---|
| BLEEDING P/R | 45 | 14 | 31.1% |
| ALTERED BOWEL HABITS | 5 | 1 | 20% |
| LOWER ABDOMINAL PAIN | 10 | 2 | 20% |
| SCREENING | 26 | 5 | 19.2% |
| MORE THAN 1 INDICATION | 30 | 26 | 86.6% |

**Figure 10: Diagnostic yield of lower GI endoscopy**

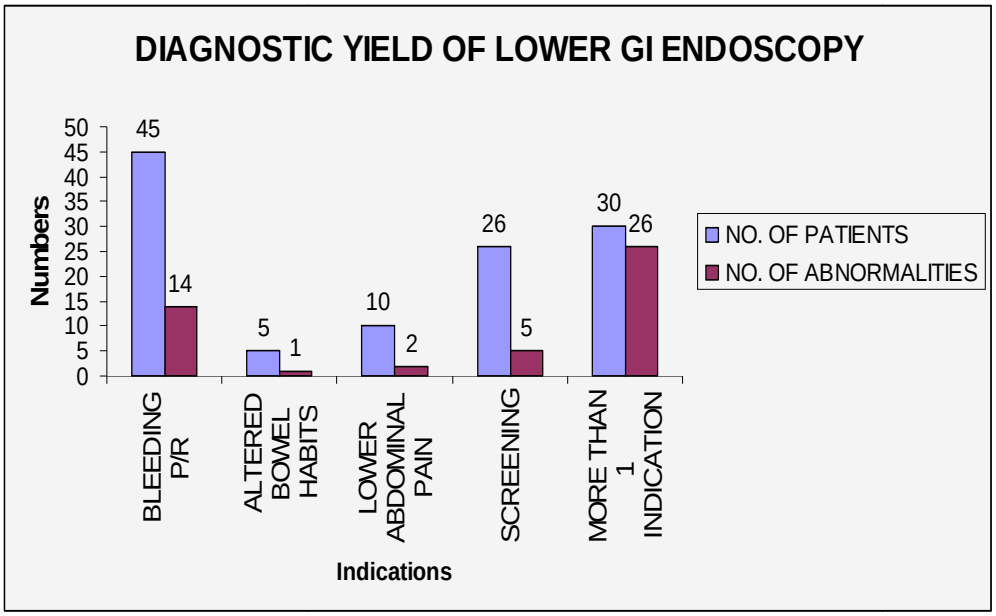


**Figure 11: Diagnostic yield of lower GI endoscopy**

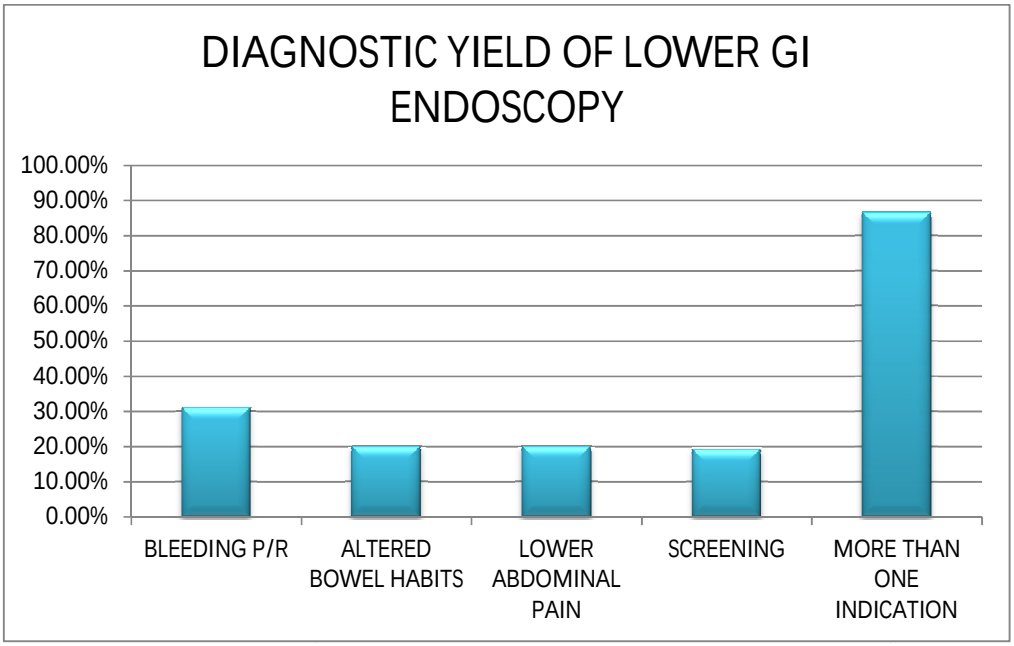

**Table 12: Complications of the Procedure observed in the Study**

| COMPLICATION | NO. OF PATIENTS | PERCENTAGE% | CONSEQUENCES |
|---|---|---|---|
| **MINOR COMPLICATIONS (ABDOMINAL DISCOMFORT)** | 6 | 6 | PROCEDURE COULD NOT BE COMPLETED |
| **MAJOR COMPLICATIONS** | NIL | - | - |

Complications observed in the study is almost nil, with only minor abdominal discomfort seen in 6 patients which made us to abandon the procedure.

# DISCUSSION

Over the last two decades, there is remarkable development in investigations for diseases of the lower GI tract; and colonoscopy has become the most commonly performed procedure for the diagnosis of diseases of the lower GI tract and screening of screening of colorectal cancer. The increasing availability of colonoscopy has led to inappropriate and overuse of this procedure which ranges from 15-35% in different studies, raising controversy regarding open access endoscopy versus a strict selection criteria for the procedure. However, by adhering to strict selection criteria, we are bound to miss some patients with significant and potentially treatable diseases. To overcome the controversy, selection of patients based on diagnostic yield of procedure for the specified indication can be done.

Patients with any of the three indications such as lower abdominal pain, altered bowel habits and bleeding p/r or a combination of these indications are subjected to lower GI endoscopy. Screening for patients with haemorrhoids, fissure in ano or fistula in ano to rule out predisposing causes and other pathology are also subjected to endoscopy. Another uncommon indication is mass in the right or left iliac fossa. Diagnostic yield of the indications are calculated.

In our study average age of the patients were 45 years which was similar to other studies such as Iqbal et al[18] and Al-Shamali et al[19]. The procedure was more commonly done in males 68% and this is slightly higher compared to other studies in which the percentage of females was slightly higher. This may be attributed to the fact that female in our country are reluctant to undergo examination of perineum.

Out of the lower GI endoscopic procedures colonoscopy was more commonly was more commonly done (68%) than sigmoidoscopy (32%) which was comparably higher than the previous study by S.K.Sahu et al[17] in which colonoscopy is performed in 53% of patients and sigmoidoscopy in 47% of patients. This is due the fact that in our study we used sigmoidoscopy only for screening of patients with haemorrhoids and fistula in ano.

Pathological findings were seen in 44% of patients which nearly matches with S.K.Sahu et al[17] (48%) and grossly higher than Al-Shamali et al[19] (21%). Bleeding p/r (45%) was the primary indication in our study, contrary to Al-Shamali et al[19] in which lower abdominal pain was the primary indication (53%). The diagnostic yield of colonoscopy for bleeding p/r was 31.1% which was very low compared to Berkowitz et al[16] (70%) and Al-Shamali et al[19] (47%). Low yield of rectal bleeding

can be attributed to the fact that haemorrhoids and fissure in ano are not considered as positive findings in our study.

The second common indication found in our study was patients presenting with more than one symptom of lower GI diseases. The diagnostic yield of colonoscopy for this group of patients was an astonishing 86.6%. This was not included in any of the previous studies of evaluating the diagnostic yield.

Lower abdominal pain as the only complaint is seen in 10% of patients which had a diagnostic yield of 20%. The low yield and less number of patients are due to the fact that most of the patients who had lower abdominal pain also had other symptoms and they are included in 'more than 1 indication' category. On the contrary, lower abdominal pain was the primary indication in study by Al-Shamali et al[19] (53%). It had a low yield of 7% for abnormalities and 0.3% for malignancies.

Altered bowel habits as the indication is seen in only 5% of patients and it had a diagnostic yield of 20%. In study by Al-Shamali et al[19], it had a yield of 35%. The low yield in our study is again contributed to the fact that most patients had other symptoms also. Screening of patients with haemorrhoids and fistula in ano also yielded pathological finding in 20% and colorectal cancer in 11%.

The common age group of presentation for colorectal malignancy was 40-60 years and the mean age was 45.6 years. The incidence among people <40 years was strikingly 32% which is significantly higher compared to the literature evidence (10%). The reason for the higher incidence among younger people though not known can be attributed to environmental, dietary and genetic factors, which mandates further analysis.

Males are more commonly affected by colorectal malignancy (60%) in our study which correlates with literature value (57.2%). The most common site of involvement of malignancy was rectum (44%) which correlates with literature value of 45-55%. The current trend of shift towards right sided colon was not observed in our study (8%).

Of the 25 patients with colorectal malignancy 18 patients (72%) had more than one symptom which shows that it is the most common presentation of colorectal cancer. Rectal bleeding was seen in 84% of patients which shows that it is the commonest symptom in colorectal malignancy.

Complication rate reported for colonoscopy is 2.8 per 1000 as per Whitlock et al[20]. Minor, transient GI discomfort was seen in 33% of patients as per Dominitz JA et al[11, 12]. But in our study there were no

major complication and only 6% had significant abdominal discomfort which mandates procedure stoppage. The low complication rate is because there were no therapeutic procedures done in our study.

## LIMITATIONS OF THE STUDY

- Small sample size in the study
- Most patients present with multiple lower GI symptoms which interferes with accurate estimation of diagnostic yield of the procedure for individual symptoms
- Only sigmoidoscopy is done for screening the patients with haemorrhoids and fistula in ano which makes the study of the colon incomplete.
- Unusually high incidence of colorectal cancer in younger age group could not be explained.
- Complication rate is not assessed correctly as therapeutic procedures were not done which may have higher complication and also patients with cardiac diseases are not included in study.

# CONCLUSION

Colonoscopy is the most important tool in the evaluation and diagnosis of diseases of lower gastrointestinal tract. The diagnostic yield of lower GI endoscopy in our study is as high as 44%, whereas the complication rate of diagnostic endoscopy is almost nil except minor abdominal discomfort. The diagnostic yield for colorectal cancer is highest for patients presenting with multiple lower GI symptoms. Rectal bleed is the most common presenting symptom in colorectal malignancy. Screening of patients with just a sigmoidoscopy who presents with common diseases of the anorectum should also be considered as this might be just the tip of the iceberg with potentially life threatening disease inside.

So from this study we conclude that lower GI endoscopy is mandatory in patients presenting with multiple lower GI symptoms and bleeding per rectum; and screening with sigmoidoscopy should preferably be considered in patients presenting with common diseases of the anorectum. In patients presenting with low yield symptoms, judicious decision making is required to either subject the patient to endoscopy or other less invasive investigations.

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# PROFORMA

**SL. NO:**

**NAME :** **AGE /SEX:** **IP NO:**

**ADDRESS WITH CONTACT NUMBER:**

**DATE OF ADMISSION:**

**DATE OF DISCHARGE:**

**HISTORY OF PRESENTING ILLNESS:**

H/O abdomen pain- onset

duration

progression

radiation

aggravating/relieving factors

H/O constipation

H/O mass descending per rectum

H/O melena, hematochezia

H/O vomiting, hematemesis

H/O altered bowel habits

H/O fever

H/O jaundice

H/O loss of appetite, loss of weight

**PAST HISTORY:**

H/O  Diabetes mellitus/hypertension/asthma/TB/epilepsy/cardiac illness

H/o similar episodes in the past, if any:

H/o major illness/ hospital admissions, if any

**PERSONAL HISTORY:**

Whether a smoker or an alcohol consumer

**FAMILY HISTORY:**

**TREATMENT HISTORY:**

**CLINICAL EXAMINATION:**

General examination:

Systemic examination:

CVS

RS

CNS

Per abdomen

Per rectal examination and Proctoscopy

Clinical diagnosis:

**INVESTIGATIONS:**

Complete blood count

Random blood sugar

Renal function test: Blood urea, serum creatinine

Liver function test

Chest X ray, ECG

Lower Gastrointestinal endoscopy

***FINAL DIAGNOSIS:***